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THE EFFECT OF DELETION PRODUCED STRUCTURES ON WORD IDENTIFICATION AND COMPREHENSION OF BEGINNING READERS

by

© Grace Velina Cosens

A THESIS
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "The Effect of Deletion Produced Structures on Word Identification and Comprehension of Beginning Readers" submitted by Grace Velina Cosens in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

Marion D. Jenkinson
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Date December 8, 1973

ABSTRACT

This study investigated the effect of deletion produced structures, as defined by a transformational generative grammar, on the word identification and comprehension of first- and second-grade pupils. It also investigated the occurrence of deletion produced structures in primary reading materials and the recoverability of deleted words. In addition, it attempted to establish validity for an oral response to the cloze technique at the first-grade level.

The investigation was conducted in two stages. The first involved analysis of sentences in primary reading materials and delineation of the set of deletion transformations to be investigated. The second stage involved collection and analysis of data.

Two basal series and selected trade books were subjected to linguistic analysis and the results used to delineate the final set of 12 deletion transformations investigated in the study. Test passages were then reconstructed from stories in a basal reading series so that each passage contained one test sentence for all 12 deletion transformations. Word identification was assessed by having pupils read these passages orally and comprehension by applying the cloze technique to all words in each passage. Recoverability was assessed by tests involving modified cloze and multiple choice formats. This resulted in 16 forms of each of the eight test passages at each grade level, necessitating a counterbalanced research design for collection of the data.

The test sample consisted of 160 pupils at each of grades one and two randomly selected from seven elementary schools in a suburban Alberta community. Each grade sample was stratified into 16 groups on

the basis of scores obtained on a standardized reading test.

An analysis of oral reading and cloze test results on three dimensions, namely number, type and location, revealed that deletion produced structures had greater impact on comprehension than on word identification. The deletion of redundant contentive information appeared to force pupils to provide more information themselves when they were reading for comprehension. When reading orally, students appeared to be striving for an oral production consistent with their language knowledge and both intact and deleted sentence structures met this criteria. The effect of the deletion transformations on comprehension was largely restricted to the string to which the transformation had applied. It was also concluded that the beginning readers in this study used their syntactic and semantic knowledge when comprehending and identifying words in both intact and deleted sentence structures, and that the application of a deletion transformation had minimal effect on use of this knowledge.

The analysis of basal reading materials revealed that the introduction of syntactic patterns was not systematically controlled. Even at the preprimer level, a large number of deletion produced structures were present.

Correlations between scores on the experimental cloze tests and the comprehension section of a standardized reading test indicated that the cloze technique is a valid measure of comprehension at the beginning reading level when an oral response is accepted from first-grade pupils.

It is clear from the findings of this study that the short fragmentary sentences present in most introductory reading material are difficult for beginning readers to comprehend. This has implications for authors of children's books as well as reading teachers.

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TABLE OF CONTENTS

CHAPTER Page

I. INTRODUCTION AND STATEMENT OF THE PROBLEM 1

Purpose 2

Definitions 3

Hypotheses 4

Organization of the Study 7

Limitations of the Study 9

Significance of the Study 9

Plan of the Investigation 10

II. BACKGROUND OF THE STUDY: WORD IDENTIFICATION, COMPREHENSION AND SYNTACTIC STRUCTURE 12

Word Identification 12

The Process of Word Identification 13

Use of Syntactic Information in Word Identification . 15

Syntactic Structure and Oral Reading Errors of Beginning Readers 17

Effect of Different Grammatical Structures on Oral Reading Errors 21

Oral Reading Errors as an Indicator of Word Identification 23

Comprehension 25

Meaning 26

Process of Reading Comprehension 29

Use of Syntactic Information in Comprehension 32

Research on Readability 34

Other Studies on the Syntactic Structure of Written Material and Comprehension 35

CHAPTER Page

The Cloze Technique as an Indicator of Comprehension 40

Summary 42

III. BACKGROUND OF THE STUDY: LINGUISTIC THEORY AND CHILDREN'S SYNTACTIC FUNCTIONING 44

Transformational Generative Grammar 44

Chomsky's Transformational Grammar 46

Alternate Approaches to Transformational Grammar . 50

On the Psychological Reality of Transformational Grammar 53

Syntactic Functioning of Beginning Readers 57

Language Development 57

Syntactic Functioning and Reading Achievement . . . 61

Summary 63

IV. THE EXPERIMENTAL DESIGN 64

The Design of the Study 64

The Sample 65

Chronological Age and Sex of Subjects in the Test Sample 67

Stratification of the Sample on the Basis of Reading Achievement Scores 67

Composition of the Treatment Groups 68

Selection and Analysis of Primary Reading Material . 68

Selection of Materials 71

Analysis of Sentence Samples 73

Testing Instruments 74

The Standardized Reading Test 74

The Research Instruments 75

CHAPTER Page

Administration of the Instruments 76

Scoring of the Instruments 78

The Standardized Reading Test 79

Oral Reading and Cloze Tests 79

Number 79

Type of Errors 80

Location 85

Recoverability Tests 85

Analysis of the Data 86

Generation of Variables 86

Statistical Analysis of the Data 87

Summary 88

V. DELINEATION OF DELETION TRANSFORMATIONS AND CONSTRUCTION OF THE RESEARCH INSTRUMENT 89

Delineation of Deletion Transformation Rules 89

Preliminary Revision Based on Theoretical and Practical Considerations 90

Final Revision Based on Analysis of Basal Reading Material 93

Construction of the Research Instrument 97

Pilot Study 98

Oral Response to the Cloze 98

Recoverability Tasks 100

Anaphoric Reference 103

Test Passages 104

Oral Reading Tests 105

Cloze Tests 106

CHAPTER Page

Recoverability Tests 106

Summary of Research Tests 107

Summary 108

VI. FINDINGS: ANALYSIS OF SENTENCES FROM PRIMARY READING MATERIALS 110

Occurrence of Deletion Produced Structures as a Group 110

Percentage of Occurrence of Each Deletion Produced Structure 112

Occurrence of Each Deletion Produced Structure in Series A 112

Occurrence of Each Deletion Produced Structure in Series B 115

Occurrence of Each Deletion Produced Structure in the Trade Books 117

Comparison by Transformation Rules Across Materials 119

Comparison by Transformation Rules at the First-Grade Level 120

Comparison by Transformation Rules at the Second-Grade Level 125

Comparison by Transformation Rules at the Third-Grade Level 127

Summary 132

VII. FINDINGS: EFFECT OF DELETION PRODUCED STRUCTURES ON COMPREHENSION 134

Validity of the Cloze Tests 134

Number of Exact Replacements on Deleted and Intact Sentence Structures 135

Difficulty of Deletion Transformations by Number of Exact Replacements 139

Spontaneous Changes in Relation to Number of Exact Replacements 143

CHAPTER Page

Type of Errors on Deleted and Intact Sentence Structures 145

Grammatical Acceptability of Errors 145

Semantic Acceptability of Errors 148

Grammatical and Semantic Acceptability 152

Location of Exact Replacements on Deleted and Intact Sentence Structures 155

Exact Replacements Preceding and Following the Deletion Transformation 155

Exact Replacements in Matrix and Conjoined/Embedded Sentences 157

Summary 160

VIII. FINDINGS: EFFECT OF DELETION PRODUCED STRUCTURES ON WORD IDENTIFICATION 163

Number of Errors on Deleted and Intact Sentence Structures 163

Difficulty of Deletion Transformations by Number of Errors 167

Spontaneous Corrections in Relation to Number of Errors 169

Spontaneous Changes to the Deleted or Intact Forms 169

Type of Errors on Deleted and Intact Sentence Structures 172

Grammatical Acceptability of Oral Reading Errors . 172

Semantic Acceptability of Oral Reading Errors . . 176

Location of Errors on Deleted and Intact Sentence Structures 179

Errors Preceding and Following the Deletion Transformation 179

Errors in the Matrix and Conjoined or Embedded Sentences 181

Summary 183

CHAPTER Page

IX. FINDINGS: RECOVERABILITY AND SELECTED BIAS VARIABLES . 186

Results of Recoverability Tests 186

Relationship of Reading Achievement to Selected Variables 192

Relationship of Chronological Age and Sex to Selected Variables 195

Summary 195

X. SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS 199

Summary of the Study 199

Main Findings and Conclusions 201

Analysis of Primary Reading Materials 201

Collection and Analysis of the Data 203

Validity of the Cloze Tests 203

Effect of Deletion Produced Structures on Comprehension 204

Effect of Deletion Produced Structures on Word Identification 212

Recoverability 218

Relationship of Selected Bias and Criterion Variables 219

Implications of the Study 220

A Theory of Beginning Reading 220

Instructional Materials and Programs 222

Psychological Reality of Transformational Grammar . 225

Limitations of the Study 226

Suggestions for Further Research 227

Concluding Statement 229

REFERENCES 230

CHAPTER Page

LIST OF PRIMARY READING MATERIALS 237

APPENDICES

A. The Experimental Passages 239

B. Directions for Administering the Research Instrument . . . 256

C. Complete Tests for First Reader, Passage Three 262

D. Multiple Choice Recoverability Tests 274

E. t-Test Results 301

LIST OF TABLES

Table Page

I. Composition of Experimental Groups at the First-Grade Level 69

II. Composition of Experimental Groups at the Second-Grade Level 70

III. Percentage of Sentences Containing Deletion Produced Structures 111

IV. Percentage of Deletion Produced Structures for Each Transformation Rule in Series A 113

V. Percentage of Deletion Produced Structures for Each Transformation Rule in Series B 116

VI. Percentage of Deletion Produced Structures for Each Transformation Rule in Trade Books 118

VII. Correlations between Gates-MacGinitie Comprehension Scores and those on the Cloze Tests 135

VIII. Means, Standard Deviations and t-Test Results of Comparisons between Number of Exact Cloze Replacements on Deleted and Intact Sentence Structures with Words that Could Be Affected by Deletion Transformations Considered 136

IX. Deletion Transformations Ranked from Most to Least Difficult in Terms of Mean Proportion of Exact Replacements with Words that Could Be Affected by Deletion Transformation Rules Considered 140

X. Mean Percentages and t-Test Results for Comparisons of Grammatically Acceptable Errors on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 146

XI. Mean Percentages and t-Test Results for Comparisons of Semantically Acceptable Errors on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 149

XII. Mean Percentages and t-Test Results for Comparisons of Errors Grammatically and Semantically Acceptable and Unacceptable on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 153

Table | Page
XIII. Mean Percentages and t-Test Results for Comparisons of Exact Replacements Preceding and Following the Deletion Transformation on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 156

XIV. Mean Percentages and t-Test Results for Comparisons of Exact Replacements in the Matrix and Embedded/Conjoined Strings on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 158

XV. Deletion Transformations Ranked from Most to Least Difficult in Terms of Mean Proportion of Oral Reading Errors with Words that Could Be Affected by Deletion Transformations Considered 163

XVI. Means, Standard Deviations and t-Test Results of Comparisons between Number of Errors on Deleted and Intact Sentence Structures with Words that Could Be Affected by Deletion Transformations Considered 165

XVII. Mean Proportions and t-test Results for Comparisons of Spontaneous Corrections on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 170

XVIII. Mean Proportions and t-Test Results for Comparisons of Grammatically Acceptable Oral Reading Errors on Intact and Deleted Sentence Structures for Each Transformation Rule at Each Grade Level 173

XIX. Mean Proportions and t-Test Results for Comparisons of Semantically Acceptable Oral Reading Errors on Intact and Deleted Sentence Structures for Each Transformation Rule at Each Grade Level 177

XX. Mean Proportions and t-Test Results for Comparisons of Errors Preceding and Following the Deletion Transformation on Intact and Deleted Sentence Structures for Each Transformation Rule at Each Grade Level 180

Table Page

XXI. Mean Proportions and t-Test Results for Comparisons of Errors in the Matrix and Embedded or Conjoined Strings on Deleted and Intact Sentence Structures for Each Transformation Rule at Each Grade Level 182

XXII. Transformation Rules Ranked on the Basis of Mean Percentage Scores on the Multiple Choice Recoverability Tests 187

XXIII. Transformation Rules Ranked on the Basis of Mean Percentage Scores on the Cloze Recoverability Tests 188

XXIV. Correlations of Recoverability Scores with Selected Criterion Variables 191

XXV. Correlations of Reading Achievement with Selected Variables 193

XXVI. Correlations of Chronological Age and Sex with Selected Variables 196

LIST OF FIGURES

Figure Page

1. Goodman's Model of Early Reading 24

2. Design of the Study 66

3. Results on the Cloze Recoverability Task 101

4. Results on the Multiple Choice Recoverability Task 103

5. Percentage of Occurrence of Transformation Rules at the Preprimer Level 121

6. Percentage of Occurrence of Transformation Rules at the Primer Level 123

7. Percentage of Occurrence of Transformation Rules at the First Reader Level 124

8. Percentage of Occurrence of Transformation Rules at the Beginning Second Reader Level 126

9. Percentage of Occurrence of Transformation Rules at the High Second Reader Level 128

10. Percentage of Occurrence of Transformation Rules at the Beginning Third Reader Level 129

11. Percentage of Occurrence of Transformation Rules at the High Third Reader Level 130

CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Throughout the years, writers in the field of reading have postulated a relationship between language structure and reading, but only recently have begun to employ tools developed in linguistics to investigate this relationship. In the early sixties, several researchers operating within the framework of structural linguistics were able to provide empirical support for this relationship (Ruddell, 1963), and by the mid sixties, researchers were beginning to use the transformational generative model of language to gain further insights. This research is still at a very preliminary stage but has given some indication of the syntactic structures which cause difficulty for children.

One class of grammatical structures which has been found by several researchers to be difficult for children is that which, in a transformational generative grammar, is produced by application of one or more deletion transformations. Deletion transformations are one of the set of elementary transformations in a transformational generative grammar and they function to remove items from a string of words. For example, the string "they think that I am too little" is converted to "they think I am too little" by one deletion transformation. Structures produced by this and other deletion transformations appear as a relatively late acquisition in the oral language production of children (O'Donnell, Griffin and Norris, 1967); they frequently trigger oral reading errors (Beaver, 1968; Becker, 1970); and are negatively related to sentence comprehension (Fagan, 1969). At this point in time, however, the strongest claim which can be made is that deletion produced structures are in some way related to difficulties with word identification and reading comprehension. The nature of this relationship, notably how these structures affect word identification and comprehension, has not yet been investigated. The present study is an attempt, through an analysis of reading behaviour, to get some indication of how, and to some extent why, these structures affect identification and comprehension.

The emphasis in construction of primary basal readers has long been on vocabulary control with little attempt to present syntactic structures sequentially, or to match written structures with those in the oral production of children. The result has frequently been short fragmentary sentences which, interpreted in the framework of transformational generative grammar, are produced by deletion transformations. Hence, this study has focused on beginning readers as they read primary basal material to get an indication of the effect of deletion produced sentence structures on word identification and comprehension at this level.

I. PURPOSE

The major purpose of this study was to investigate the effect of deletion produced structures, as defined by transformational generative grammar, on the word identification and comprehension of first- and second-grade pupils. To achieve this purpose, a comparison was made between oral reading errors and cloze responses obtained on sentences containing deletion produced structures and those on sentences in which words which could be deleted were left intact. Oral reading errors and cloze responses were considered in terms of number, type and location to obtain both quantitative and qualitative information.

A second major aim of the study, and this is a prerequisite to the first, was to determine and compare the occurrence of deletion produced structures in primary basal readers from grades one to three and in selected trade books. A further aim involved the establishment of validity for an oral response to the cloze test at the first-grade level.

In addition the study investigated recoverability of deleted words by first- and second-grade pupils, and the relationship of recoverability with performance on the oral reading and cloze tests. It also investigated the relationships of reading achievement, chronological age and sex with performance on oral reading, cloze and recoverability tests.

II. DEFINITIONS

For the purposes of this investigation, the following definitions were employed.

Written language - is the graphic representation of the English oral language as it appears in handwriting or print. This includes the commitment to writing of the thoughts of a person which have not been uttered in speech (Robertson, 1966).

A sentence - is a structured string of words produced by the rules of a transformational generative grammar. For the purposes of selecting sentences of the texts for analysis, a sentence is defined as a word or string of words (surface form) that extends from a capital letter which appears after a period, a question mark, or an exclamation point to a period, a question mark, or an exclamation point which immediately precedes a capital letter (Fagan, 1969).

Generative grammar - is a system of rules that in some explicit and well defined way assigns structural descriptions to an infinitely large number of sentences.

Transformation rule - is a rule which operates on a string with a given constituent structure and converts it into a new string.

Deletion transformation - refers to one of the set of elementary transformations. It functions to remove items from a string subject to certain conditions.

Deletion produced structure - refers to a string which has passed through one or more deletion transformations.

Intact sentence structure - refers to a string in which words that could be optionally deleted by a transformation rule have been left intact.

Recoverability of deletion - in this study refers to a convention in transformational grammar that items deleted through transformation must not change meaning and hence, must be recoverable.

Reading achievement - refers in this study to performance of the test sample on the Gates-MacGinitie Reading Tests.

Cloze tests - refers to tests produced by the mechanical predetermined deletion of every fifth word in test passages. Cloze recoverability tests were also produced by selective deletion of words or groups of words affected by deletion transformations.

III. HYPOTHESES

In order to achieve the purposes set out in this study, the following null hypotheses were derived.

1. In order to investigate the effect of deletion produced structures on the word identification and comprehension of first- and second-grade pupils, the following null hypotheses were tested.

1.1 There is no significant difference on cloze responses in sentences containing deletion produced structures and those containing intact sentence structures when each of the following characteristics of cloze responses are considered:

- (a) number of correct responses
    - (i) proportion of exact replacements excluding inserted words
    - (ii) proportion of exact replacements including inserted words
- (b) type of errors
    - (i) proportion of errors syntactically acceptable in terms of the item involved and in terms of sentence context
    - (ii) proportion of errors semantically acceptable in terms of the item involved, sentence context and passage context
    - (iii) proportion of errors semantically and syntactically acceptable in terms of sentence context
    - (iv) proportion of errors neither semantically nor syntactically acceptable in terms of sentence context
- (c) location of exact replacements
    - (i) proportion of exact replacements preceding the deleted words or the words which could be deleted
    - (ii) proportion of exact replacements following the deleted

words or the words which could be deleted

- (iii) proportion of exact replacements occurring in the string to which the deletion transformation applies (conjoined/embedded string)
- (iv) proportion of exact replacements occurring in the matrix string

for each particular transformation rule and for transformations as a group.

1.2 There is no significant difference in oral reading errors on sentences containing deletion produced structures and those containing intact sentence structures when the effect of word identification in isolation is taken into consideration and the following characteristics of oral reading errors are considered:

- (a) number of errors
    - (i) proportion of errors excluding inserted words
    - (ii) proportion of errors including inserted words
- (b) type of errors
    - (i) proportion of errors syntactically acceptable in terms of the item involved, sentence context and passage context
    - (ii) proportion of errors semantically acceptable in terms of the item involved, sentence context and passage context
- (c) location of errors
    - (i) proportion of errors preceding the deleted words or the words which could be deleted
    - (ii) proportion of errors following the deleted words or

the words which could be deleted

(iii) proportion of errors occurring in the string to which the deletion transformation applies (embedded/conjoined)

(iv) proportion of errors occurring in the matrix string for each particular transformation rule and for transformations as a group.

2. Recoverability of deleted words is not significantly related to:

(a) proportion of oral reading errors or correct cloze responses on deleted and intact sentence structures

(b) differences in the proportion of correct cloze responses on sentences containing deletion produced structures as compared to those with sentences left intact.

3. There is no significant relationship between the following variables:

(a) reading achievement

(b) chronological age

(c) sex

and the following criterion variables:

(i) recoverability scores

(ii) proportion of oral reading errors and correct cloze responses on deleted and intact sentence structures.

IV. ORGANIZATION OF THE STUDY

This investigation was conducted in two stages. The first involved the simultaneous analysis of sentences in primary reading material and formulation of the set of deletion transformation rules to be investigated. The second stage involved collection and analysis of data. Two basal series and selected trade books were subjected to linguistic analysis and the results of this analysis were used to delineate the final set of 12 deletion transformations investigated in this study.

Several instruments were specifically constructed for this study. Eight test passages were reconstructed from stories in the Ginn Basic Readers so that each passage contained test sentences for all 12 deletion transformations, half in deleted form and the other half intact. Word identification was assessed by having children read these test passages orally. The cloze technique was applied to all passages to measure comprehension. Recoverability of deleted words was assessed by tests involving multiple choice and modified cloze formats. Since this resulted in 16 forms of each of the eight test passages at each grade level, a counterbalanced research design was used in collection of the data.

The population for this investigation consisted of grades one and two pupils from seven elementary schools in a suburban area of Alberta. At each grade level 160 pupils were randomly selected from this population to form the test sample. All pupils in the test sample were administered the Gates-MacGinitie Reading Tests. Each grade sample was then randomly stratified into 16 groups on the basis of scores obtained on this test.

Oral reading and cloze tests were scored on three dimensions--number, type and location--to obtain both quantitative and qualitative information about the effect of deletion produced structures on word identification and comprehension.

Data were combined across test sentences for each version of each transformation rule and converted to proportion scores prior to statistical analysis. Computations of correlation, t-test and one-way analysis of variance programs were then applied to the data.

V. LIMITATIONS OF THE STUDY

The sentences chosen for analysis were from two basal series and a restricted set of trade books. This may not be a large enough sample from which to make generalizations. In addition, beyond the first reader level, a sampling procedure was used to select material for analysis.

The syntactic structures investigated in this study did not include all possible deletion transformation rules. The nature of the test instruments and the grammatical structures present in primary reading materials restricted consideration to a subset of deletion produced structures.

The sample was drawn from a suburban, middle to lower middle class area and the results can be generalized only to similar populations.

VI. SIGNIFICANCE OF THE STUDY

Recent research has suggested that certain syntactic structures in written language are related to both word identification and comprehension difficulties. This study focused on one class of these structures, those produced by deletion transformations, and attempted to find out how, and to a limited extent why, these affect word identification and comprehension at the beginning reading level. The more that can be learned about how these structures affect children, the more one can do to help children master these in their reading.

Very little is known about the nature of syntactic structures in primary basal reading materials. The emphasis appears to be on vocabulary at this level with little attempt to introduce syntactic structures sequentially or to consider the oral language production of beginning readers. This study provides information on the occurrence of one type of syntactic structure in basals from first- to third-grade and in selected trade books. The results also provide further information concerning the difficulty of deletion produced structures, and hence, have implications for readability of primary reading materials. Authors of children's texts may need to consider syntactic structure to a much greater extent than they presently do.

The cloze test is generally considered to be a valid and reliable measure of reading comprehension from the upper elementary to adult levels. Few studies have investigated the use of this technique at the primary level and there is some question about the validity and reliability of cloze tests particularly with pupils in grade one. This study provides further information concerning the validity of the standard cloze procedure at the second-grade level and of an oral response to the cloze at the first-grade level.

Although this study does not assume the psychological reality of transformational generative grammar, the results have direct significance for this problematic area. Since deleted and intact sentence structures differ by the application of one transformation rule, information concerning the relationship between linguistic and psychological complexity is made available.

VII. PLAN OF THE INVESTIGATION

The investigation is reported according to the plan indicated below.

Chapter II presents a theoretical discussion of, and relevant research on, word identification and comprehension processes. Further background information is provided in Chapter III with a discussion of transformational generative grammar and the syntactic functioning of beginning readers.

Chapter IV describes the experimental design of the study and Chapter V deals with formulation of the set of deletion transformations investigated and construction of the research instruments.

The results of the linguistic analysis of primary reading materials are set out in Chapter VI.

Chapter VII reports findings on the effect of deletion produced structures on comprehension and Chapter VIII discusses the effect of these structures on word identification.

The results of the recoverability tests and correlations of selected variables are presented in Chapter IX.

The final chapter, Chapter X, reports the main findings with reference to hypotheses presented in Chapter I and discusses conclusions and implications of the study.

CHAPTER II

BACKGROUND OF THE STUDY: WORD IDENTIFICATION, COMPREHENSION AND SYNTACTIC STRUCTURE

Weiner and Cromer (1967), in their attempt to present a conceptual framework for reading, noted several issues which have resulted in ambiguity and confusion in the study of reading. One issue involves the distinction between identification and comprehension. Weiner and Cromer suggest that failure to distinguish between the acquisition and accomplished stages of reading has resulted in much of this confusion. They maintain that in the acquisition of reading skills, identification is a necessary antecedent to comprehension, but for the skilled reader, it may be irrelevant.

The present study is concerned with the reader in the acquisition stage, and hence, will consider both word identification and comprehension. This chapter will provide a theoretical framework as well as discuss the role of syntactic structure for each of these, and will provide background information used in choosing appropriate measuring instruments.

I. WORD IDENTIFICATION

Identification within the conceptual analysis presented by Weiner and Cromer (1967, p. 635) means "word naming" in the sense of a visual-to-auditory transformation of stimuli. Considered in this sense, identification has a restricted meaning and is subsumed in earlier views such as that represented in Gray's definition of word perception as simultaneous association of form, meaning and sound (Gray, 1960).

Weiner and Cromer's view is upheld by several writers in the fields of reading and psychology. Carroll (1970), for example, defines word identification as awareness by the child that he has seen a word before and that he is able to pronounce it.

The Process of Word Identification

Investigations have been conducted since the late nineteenth century in an attempt to explain the phenomenon of word identification. Three theories have been predominant in this area: whole-word identification, letter-by-letter identification, and identification of words through letter clusters, but as Neisser (1967) has clearly shown, none of these theories can account for the research results reported to date. He considers word identification as a problem within the broader area of pattern recognition and, after summarizing data in this area, has proposed a theory to account for the data and to explain the process of word identification. Neisser's work is beginning to have some impact in the field of reading (Smith, 1971, 1973; Holmes, 1971) and provides the framework within which word identification is considered in the present study.

Neisser (1967) begins by considering the two main theoretical approaches which have been used to explain pattern recognition. The first, template matching, assumes that a figure is identified by noting its congruence with a basic model stored in memory and has obvious difficulties. Words can be recognized in new positions, orientations, and in different face types and styles. It is also possible to identify some meaningless strings of letters easier than others depending on their approximation to English. These strings have never been seen before and, hence, cannot be stored as templates. Neisser suggests, in light of these and other problems, that words cannot be stored as templates.

The second alternative he presents is a feature-analytic model. The fundamental assumption is that there are analysers which test the input for the presence of specific features. The details of these features are not known, but some information on this has been provided in research studies by Gibson et. al. at Cornell University.

In two recent books, Smith (1971, 1973) relies on the analytic model to explain word identification in reading. He suggests that the reader identifies words from featural information without the intervening identification of any letters that make up the word. These features include features of letters, still largely unknown, and the position of the feature within a sequence. From this view, Smith suggests two aspects of word identification. The first involves analysis of features to establish functional equivalence with criterial sets of features for each word category, and the second is associating a name with the category. Smith describes the process of word identification as a series of tests made directly on the input. The results of each test eliminate a number of alternate responses until finally all uncertainty is reduced and identification is achieved. Orthographic information or the probability of letter sequences results in sequential redundancy which reduces the amount of featural information necessary for identification.

Neisser (1967) indicates that although the feature analytic model overcomes many of the deficiencies of template matching, neither of these do justice to human pattern recognition unless they are supplemented by some notion of attention. There must be some way to concentrate the process of analysis on a selected portion of the visual field. To achieve this, he postulates two levels of analysis. The first, preattentive processes, segregate the figural units involved; and the second, the act of focal attention, makes a more sophisticated analysis of the chosen object. Focal attention, however, does not simply involve examination of the input and assignment to a category. It is a constructive, synthetic activity in which the perceiver builds an appropriate visual object. Neisser suggests that in word recognition the reader engages in two constructive acts; he synthesizes a visual word or spelling pattern and also a verbal response. This view readily accounts for errors and failure to recognize them. It also accounts for a figural synthesis which does not depend only on features extracted from the input. Equally important is the kind of object the perceiver is prepared to construct; set and context predispose the subject to construct one visual figure rather than another. And if what he constructs visually is not an acceptable response, context may help him make a suitable verbal interpretation. Part of this context when identifying words in sentences is undoubtedly syntactic structure and the role that syntax plays in word identification will be discussed in the next section.

Use of Syntactic Information in Word Identification

The potential effect of syntactic structure on word identification has been recognized by Weiner and Cromer (1967). They suggest that syntactic structure plays an important role in identification mainly by reducing the amount of information required for identification to occur. Syntax limits the possible types of words or sequences which occur at a given time. In other words, syntactic structure reduces the amount of information required for synthesis, both visually and verbally.

What syntactic cues are used by readers to reduce the amount of graphic information needed for word identification is still largely a mystery. Levin and Kaplan (1969), for example, in eye-voice span studies with proficient readers, concluded only that the entire sentence is involved. This was also shown by Mehler, Bever and Carey (1967) in their investigation of eye-fixations. They concluded that the entire phrase structure influences visual scanning patterns. Fixations were made on the first half of phrase structure constituents.

It has been shown that nonsense words are easier to learn and recall in the context of syntactic markers than without these markers, for example, the marlup was poving his kump (K. Goodman, 1968). Function words and inflections are obviously important, but it is not at all clear how they are used as cues during reading.

The observations presented above have involved proficient readers. Smith (1971) feels that although proficient readers make considerable use of syntactic redundancy, the beginning reader is forced to analyse all the constituents of the surface representation to apply syntactic skills. He suggests that the beginner must attempt to identify the words of the visual representation one at a time without any prediction. There is increasing evidence from studies of oral reading errors, however, that children predict from syntactic patterns very early in their reading.

Syntactic Structure and Oral Reading Errors of Beginning Readers. As early as 1959, MacKinnon, in his presentation of anecdotal reports on children learning to read, noted that their errors indicated greater sensitivity to the grammatical structure of the language than to the visual form of the words.

The first of a series of articles by K. Goodman concerning oral reading miscues appeared in 1965. In this article he presented the results of a descriptive study of the oral reading of first-, second- and third-grade children. Reading was referred to as a psycholinguistic process which is cued or miscued during the child's interaction with written language. K. Goodman suggested that cue systems included those within words, those in the flow of language, those external to language and the reader such as pictures, and those within the reader. The children were required to read words in a list, and then to read a story orally from the book on which the list was based. Results indicated that the children were able to read many words in context which they could not read in lists. Ability to do this increased with grade level and this was interpreted by K. Goodman to mean that children in successive grades were increasingly efficient in using cue systems outside of words.

A short time later, a preliminary working model of the Linguistic Taxonomy of Cues and Miscues in Reading was presented by K. Goodman and his wife, Yetta. As rationale for the taxonomy, K. Goodman and Y. Goodman (1965) stated that reading is a continuous information processing activity as the reader interacts with the printed page. They assumed that unexpected responses resulted from misuse or incomplete use of language information. Their classification scheme involved three general linguistic levels: phoneme-grapheme or letter sound level, word-morpheme level, and grammatical-syntactical level.

By 1967 when Y. Goodman's dissertation was completed, the taxonomy had undergone considerable revision in an apparent attempt to distinguish more clearly use of syntactic, semantic and phono-graphic cue systems by readers. In her study, Y. Goodman (1967) described the observed oral reading phenomena of six beginning readers during the first year of instruction. She noted that all children in her sample made miscues, and that their comprehension was adequate with from five to 14 miscues per hundred words. Miscues occurred at all levels of language with most at the word and phrase levels. The grammatical function of the response tended to be the same as the grammatical function of the stimulus. Y. Goodman noted that knowledge and use of syntax had a greater influence on miscues than meaning, but as readers became more proficient, they used both. She also found that when the language of the reading material was not like their own, her grade one sample attempted to translate it into their own language system.

In 1969 K. Goodman presented a second revision of his taxonomy and this has served as the stimulus for several studies, most at the upper elementary level. Shandling's study (1970), although it did not involve pupils in the first or second grade, employed this taxonomy to analyse the oral reading miscues of 10 dyslexic boys between the ages of eight and 10 who were essentially still at the acquisition stage of reading. She examined their ability to recognize words in lists and in stories and found only small differences between the percentages of words read correctly. All subjects were strongest in ability to process syntactic information, and the difference between their ability to use this system and the semantic and grapho-phonic systems was marked. Ability to integrate information from the syntactic system with that from the semantic and grapho-phonic systems was poorly developed.

Several researchers have examined children's oral reading errors within a different framework than that presented by the Goodmans. Clay (1968) presented a syntactic analysis of the reading errors of 100 beginning readers observed during their first year in school. Seventy-two per cent of the substitution errors were in equivalent morpheme class or morpheme sequence class structures as the stimuli. When an error was of a nonequivalent class, the potential for correction was high. Clay carried out an additional analysis of single word substitutions to estimate phoneme-grapheme correspondence. Only 41 per cent of the single word substitutions showed that the child might have been responding to visual characteristics of the letters. Clay concluded that at points of uncertainty, a young child's guesses tend to be dominated by his control over the syntax of his language.

Nurss (1969) considered two samples of second-grade pupils. These children read six one-sentence stories aloud and their reading was taped. The sentences represented three levels of structural complexity as analysed by Allen's sector analysis, a structuralist approach. Errors were categorized into traditional categories, and in addition, were grouped on the basis of grammatical and semantic "sense" or "lack of sense". Nurss found that children made more errors when reading the more complex sentences. She also found that errors more frequently made sense in sentences of low structural depth than in those of high structural depth, and that fewer hesitations occurred at non-grammatical junctures in sentences of less complex structure than in those of more complex structure.

Weber (1970) analysed first-grade reading errors as approximations to the correct response in terms of graphic similarity, word structure, grammatical acceptability and semantic appropriateness. She found that one-fifth of all substitutions bore no graphic similarity to the stimulus, and that the high reading group had a mean graphic index over 100 points above that of the low group. Considering syntactic structure, Weber found an overwhelmingly large percentage of substitutions, 91.9 per cent, were grammatically appropriate to the preceding context, and that the difference between high and low groups in this respect was negligable. Most of these syntactically acceptable errors were also consistent with the meaning of the sentence. On the basis of her findings, Weber concluded that from the beginning, children expect sentences to conform to the structures of the language they know and they use this knowledge as they read.

Weber (1969) presented data obtained in a second study conducted in a first-grade class by Robinson. Results showed that 88 per cent of responses were grammatically acceptable and that there was little difference between achievement groups.

Biemiller (1970) analysed oral reading errors made by 42 first-grade children from October to May in terms of contextual and graphic constraints. Use of contextual information was inferred if an error made sense grammatically and semantically in terms of the preceding context. Three main phases of development were identified. The first was characterized by a predominance of contextually constrained errors; the second by a predominance of non-response errors and an increase in graphically constrained errors; and the third by an increase in the co-occurrence of graphically and contextually constrained errors.

The above studies leave little doubt that beginning readers bring their knowledge of the syntactic system to the printed page, and that this cue system plays an important role in identification of words when reading orally. These studies, however, have considered syntactic structure in a very general way with little attempt to differentiate among grammatical structures. A small number of studies with subjects above the primary level have made some effort in this direction and these are briefly reported below.

Effect of Different Grammatical Structures on Oral Reading Errors. Beaver (1968) analysed the reading lapses of thirty pupils from grades one to nine. He assumed that oral reading involves decoding and a kind of back encoding for redelivery. He hypothesized that lapses would reveal simpler or earlier transformational complexes, or would follow simpler rules of the base than those represented in the printed sentences. Results suggested that two processes, phonological remapping and syntactic remapping, were going on, and that the latter usually dominated. Only one-fifth of the lapses collected could be classified as phonological mismappings. In his consideration of lapses reflecting transformational reduction, Beaver noted that students frequently repeated part of coordinations which had been deleted. He also noted instances of supplying the deleted relative, the deleted marker to, shifting post nominal adjectives to the prenominal position, and supplying deleted objects. Sentences involving a simplification of syntactic structure were frequently semantically anomolous. Beaver suggested that during oral reading, the reader's syntactic component is turned on and his semantic component is turned off. Although Beaver's interpretation is probably an oversimplification of what occurs during oral reading, it is interesting to note the abundance of words affected by deletion transformations which were spontaneously inserted by pupils in his sample.

Three studies conducted at Wayne State University using Goodman's taxonomy also gave some indication of syntactic structures which tend to involve a high percentage of errors. Burke (in Y. Goodman et.al., 1969) studied the miscues involving changes in grammatical structure made by six highly proficient readers in the sixth grade. She noted grammatical fit between stimulus and response in regard to nouns, verbs and function words, but not adjectives or adverbs. Adjectives were replaced with equal frequency by other adjectives, nouns or function words. Burke suggested that nouns and adjectives follow determiners with equal frequency in our language, and that at points where the structure of our language allows for alternate structures to occur, increased restructuring does in fact occur.

Allen (in Y. Goodman et.al., 1969) studied average readers in each of grades two, four and six. He noted many substitutions at verb and noun phrase levels, omissions and insertions of function words, and omissions of deletion transformations.

A further study designed specifically to analyse miscues involving grammatical transformations was reported by K. Goodman and Burke (1969). A re-transformation was designated as any change in grammatical structure. The sample involved grade two, four and six good readers. Non-transformation miscues had high syntactic proximity and acceptability, with somewhat lower semantic proximity. Re-transformation miscues also had higher syntactic proximity and acceptability than semantic proximity, but the semantic proximity of re-transformation miscues was higher than that of non-transformation miscues. K. Goodman and Burke suggested that as readers got older, they moved closer to the deep structure of the author, but used an alternate way to encode and, hence, produced minor changes. Re-transformation miscues tended to occur at pivotal points in language structure, points at which alternative structures are possible.

An Alberta study, conducted by Becker (1970) with 15 boys and 15 girls in grade four, also gave some indication of the effect of different grammatical categories and structures on oral reading miscues. Goodman's taxonomy was used to categorize errors. Over 50 per cent of all miscues involved function words. Other language structures which caused difficulty were clause markers, adjective and adverb clauses, noun clauses and noun adjuncts. Becker also noted that deletion and embedding transformations were a source of difficulty although she did not study these in detail.

Although none of the above studies have specifically investigated the effect of deletion produced structures on word identification in oral reading, the difficulty of these structures has frequently been noted. This may occur because points at which optional deletion transformations have applied are those at which at least one other alternative structure is possible, and these appear to be sources of oral reading errors.

Oral Reading Errors as an Indicator of Word Identification

Implications have been drawn from studies of oral reading errors about the influence of syntactic structure on word identification throughout the preceding section of this chapter. This is not meant to imply that only word identification is occurring when beginning readers are required to read orally but rather a temporal priority of word identification. Weiner and Cromer (1967) have indicated that word identification is a necessary antecedent to comprehension for children in the acquisition stage of reading.

Oral production during the acquisition stage is assumed to involve the visual and verbal synthesis suggested by Neisser as the process of word identification. K. Goodman's model of early reading is consistent with this interpretation. As shown in Figure 1 (K. Goodman, 1970, p. 17), the child recodes graphic input as speech and then using his own speech as input decodes to meaning. Recoding refers to word-calling or sounding-out. K. Goodman differentiates little between silent and oral reading at the beginning stage although he does concede that there may be some direct decoding from print to meaning. As readers become more proficient, he suggests that silent reading becomes so habitual that oral reading becomes quite different than it was in the acquisition stage. Graphic input is decoded and then encoded as oral output with minimal recoding directly from graphic input to oral output.

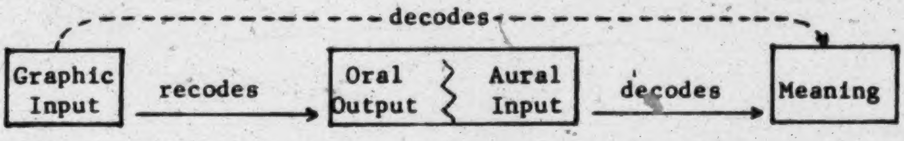


FIGURE 1

GOODMAN'S MODEL OF EARLY READING

Crosby and Liston (1968) presented a model of reading at three levels. Beginning readers are thought to pick up the visual image which is transferred to the visual areas of the brain. Letters are distinguished and the child recognizes that he has perceived a word and identifies it. At that point the child says the word aloud and then uses his language processing mechanisms to comprehend the spoken words. As readers become more proficient, they eliminate the mechanisms of motor-speech.

Gibson (1970) and J. Mackworth (1972) agree that at the beginning stage, a necessary first step in the reading process, particularly in oral reading, is word identification. This view does not imply that there is no interaction between word identification and comprehension, however. There is little doubt from studies cited that children use semantic cues to aid word identification from the beginning stages of reading.

Many writers feel that oral reading provides a relatively direct view of the reading process, but the observed behaviour in oral reading is an oral production and inferences must still be made regarding underlying processes. Oral reading is an uninterrupted, on-going activity, however, and it appears that analysis of oral reading miscues does give some indication of syntactic and semantic strategies used by readers in word identification.

II. COMPREHENSION

In 1972 N. Mackworth noted that the "full complexity of the reading process is revealed by the great difficulty involved in trying to analyse the nature of reading comprehension" (p. 691). Part of the problem, as Jenkinson (1968) has noted, is that the comprehension process is not overt and hence, much has to be inferred indirectly. In a summary statement on the nature of comprehension in 1968, she noted that most definitions have concentrated on cognitive processes such as problem solving or divergent and convergent thinking, although there has been some attention to the affective domain. She found a synthesis of work in the area difficult because of the diversity and lack of "concensus concerning underlying theory" (p. 3).

Simons (1971) in a further survey of literature feels that much of the confusion in discussions of comprehension involves the distinction between product and process. He evaluated seven approaches to reading comprehension--the skills approach, the measurement approach, the factor analytic approach, the correlational approach, the readability approach, the introspective approach and the models approach. He concluded that none of these have been very successful in making inferences about the reading process largely because past research has not been theory based. He also noted failure to distinguish comprehension from other psychological processes.

The only concensus coming from the literature is that comprehension implies meaning and this may be the stumbling block. Few in the field of reading have seriously approached the nature of meaning.

Meaning

Meaning, although vital in any consideration of human communication, has tended to be ignored by both psychologists and linguists as well as by those in the field of reading. Osgood (1961) suggests that this neglect has occurred because meaning involves something nonmaterial and as such has been left largely to the philosopher.

Meaning has been defined by philosophers in several different ways with different emphases. Early philosophers thought of meaning as reference, a relationship between word and object, and this view is still represented in a more sophisticated form in the twentieth century (Ogden and Richards, 1923). Others have suggested that meaning involves the ideas for which words stand. These do not reside in the objective world but in the minds of language users (Locke in Hayden, 1965).

A popular view in the twentieth century, springing from Wittgenstein's Philosophical Investigations, is meaning as use. Wittgenstein refutes the idea that a word refers to or stands for something, but suggests instead that to know what a word means is to discover what function it serves. This view gives meaning a dynamic, relative nature and recognizes the importance of context for meaning. Others have suggested, however, that just because use presupposes the notion of meaning, it cannot be used to replace it (Findlay, 1968).

A second view which attempts to account for the implications of context for meaning is that presented by Morris. In his Foundations of the Theory of Signs (1938), he postulated the following components of semiosis: sign vehicle (that which acts as a sign); designatum (that which the sign refers to); interpretant (effect on some interpreter); and interpreter. Morris abstracted a number of dyadic relationships from these including: semantics, the study of relationships of signs to objects; pragmatics, the study of relationships of signs to interpreters; and syntactics, the study of relationships of signs to one another. He suggested that meanings "are not to be located as existences at any place in the process of semiosis but are characterized in terms of this process as a whole" (p. 45).

Morris' theory of meaning was used as the starting point in a recent attempt by Rommetveit, a Norwegian psychologist, to bring together empirical and theoretical work in psychology and linguistics into a coherent theory of Words, Meanings and Messages (1968). Word meaning, Rommetveit suggests, is generated from a word form (visual and verbal synthesis) by a process of semantic attribution. In the case of designators, semantic attribution involves, firstly, referential meaning. Incorporating Osgood's work on affective word meanings and the work of other psychologists on word associations, he suggests that a full fledged word meaning may be portrayed by an initial act of reference followed by sustained cognitive representation, affecting and being affected by concurrent associative and emotive processes. Referential meaning potentialities tend to be the core although some words, such as crime and democracy have both referential and affective response patterns as major potentialities. This view is somewhat similar to that presented by Ogden and Richards in the "context theory of meaning". They see words as instruments with two functions, referential and emotive. When heard, they cause the hearer to perform an act of reference and to assume an attitude similar to the act and attitude of the speaker. Ogden and Richards agree with Rommetveit that words do not all have the same kind of meaning. Function words, for example, have no referent and have to be examined in terms of contributions to longer segments of utterance.

When words occur in context, Rommetveit suggests that temporal constraints alone will result in some process of elimination, with associative meanings the most affected. In addition the processing of preceding words will be largely responsible for the internal semantic state when processing subsequent words and may constrain the search for a semantic correlate to a restricted domain. There are also retroactive modifications of meaning where particular potentialities of a given word form other than its primary reference are brought into action by subsequent context. Meaning potentialities are also influenced by non-linguistic, pragmatic factors. This is most apparent for deictic words which introduce into the message some elements in the situation, but in all speech acts, only those potentialities which fit into the situational frame are brought into action. A final factor involved in meaning is syntax. Rommetveit suggests that syntactic cues, such as order, word combinations etc., are used to arrive at semantic groupings. Syntactic structure also determines to some extent which potentialities of a word's entire meaning pattern will be activated.

Meaning is being conceived in this study within the framework presented by Morris and Rommetveit. Word meaning is viewed as a collection of referential, emotive and associative meaning potentialities. Meaning of sentential and discourse materials depends on the interaction of these meaning potentialities, the linguistic context and the situational frame of reference. As Morris points out, meaning is not to be found at any one place in this interaction but involves the process as a whole. In the reading situation pragmatic factors would have a much more limited impact on meaning than in one involving aural language.

Process of Reading Comprehension

Reading for meaning is being seen by more and more writers in the field of reading as a predictive, hypothesis testing language processing activity. K. Goodman (1970) refers to reading as a psycholinguistic guessing game in which the reader picks and chooses from the available information only enough to select and predict a language structure which is decodable. It is not a process of precise sequential word recognition. Instead, the reader uses the least amount of available information necessary to reconstruct the meaning. K. Goodman maintains that proficient readers can go directly from print to meaning. Reading for meaning at the beginning level, however, generally involves recoding graphic input as speech which is then decoded. The child uses his knowledge of language in both the recoding and decoding stages.

Kolers (1970) agrees with K. Goodman's view of the proficient reader and refers to reading as only incidentally visual. He feels that the proficient reader operates on the semantic or logical relations of the material being read to the point of disregarding the actual printed text.

K. Goodman's hypothesis testing theory is similar to the analysis-by-synthesis model of listening (Chomsky and Halle, 1968). Sentence comprehension in listening or reading is seen as an active hypothesis testing procedure. After a preliminary analysis of a sentence, a reader uses his linguistic knowledge to construct a hypothetical interpretation and to test this interpretation against additional information in memory, in subsequent parts of the message, and perhaps as well in previous parts by regression. If data are consistent with the hypothesis, the reader's construction would be accepted as the intended meaning; otherwise the hypothesis would have to be reconstructed and retested. Neisser (1967) suggests that in reading for meaning the reader does not construct a verbal response, but rather a non-sensory structure, a continuous stream of thought.

Ryan and Semmel (1969) also feel that language processing strategies are utilized by the reader in perception and comprehension of printed material. Reading is viewed as an active process in which the reader forms and tests hypotheses about the information in the text rather than passively reacting to written forms unit by unit. Reading in this sense is a constructive process to which the reader makes a significant contribution. These writers feel that beginning readers use essentially the same strategies as those more proficient.

Ainsfeld (1966) considered reading to involve information processing in the sense of elimination of uncertainty. Reading was not seen as a process in which the reader extracts full information from print but one of using information to decide among alternatives. Ainsfeld's idea has been developed more fully by Smith (1971, 1973) who defines comprehension as reduction of uncertainty. Smith feels that comprehension occurs when the reader is able to eliminate some or all of the alternate meanings that a visual configuration might convey. He suggests that the fluent reader is able to identify meaning directly from visual features by using semantic and syntactic redundancy. Redundancy facilitates comprehension by making far less visual information necessary. Smith indicates that beginning readers must first identify words and then meaning. He sees the fluent reader as using information simultaneously at both the surface and deep structure levels of language, but the beginning reader must deduce meaning from surface structure. The novice is forced, he suggests, to analyse all of the constituents of the surface structure to apply his syntactic knowledge and identify meaning.

The idea that fluent readers go directly from print to meaning is by no means universally accepted. The polar view has been presented by Brown (1970) who, in his model of proficient reading, depicts a strong link between production and perception of language. He feels that reading usually involves a subconcious translation to oral language processing and in 1971 summarized research evidence to support this view. Levin (1965) hypothesized that speakers of language store auditory representations of language in their memory. When the printed word is exposed, the reader rehearses it and this rehearsal is matched to representations in auditory memory.

In the present study reading at all levels is seen as a predictive language processing activity with the probability of recoding graphic stimuli as oral language much greater during the beginning than proficient stage of reading.

Although transformational grammar is being used as the linguistic base for this study, no performative implications are being drawn from this model. Hence, no suggestion is being made that meaning rests in the deep structure or that pupils must go from surface structure to an underlying structure and then to meaning (K. Goodman, 1971; Smith, 1971; Morton, 1964; Simons, 1971). Reasons for rejecting this point of view will be discussed in Chapter III.

Use of Syntactic Information in Comprehension

When reading for meaning is viewed as a predictive language processing activity, syntactic structure plays a vital role. K. Goodman (1967) has suggested that language would be a hopeless jumble incapable of carrying meaning without structure and system. The meaning of a sentence or paragraph is not the sum of the meanings of a sequence of individual words. It is a unit created by meaning bearing words organized in language structure.

Gamlin (1969) also feels that what we understand is a function of the content and sequence of words in a sentence. The contents of words have no fixed relationships to one another; these relationships are indicated by language structure. Ammons (1969), too, suggests that syntactic structure is central to meaning. He feels that to a large extent the essential meaning of a sentence may be expressed in terms of underlying grammatical relationships such as subject-predicate or verb-object. Hence, one function of syntactic structure in comprehension involves access to the functional relations in a sentence.

K. Goodman (1970) suggests that three main types of syntactic information are processed by the reader. The first are sentence patterns which involve the grammatical sequence of language. The second are pattern markers and among these are function words. Function words, relatively without definable meaning, signal the grammatical function of other elements. Inflections, another type of pattern marker, are bound morphemes which convey basically graphic information. Function words and inflections together set up the pattern and structure of the sentence and thus link together and define the relationships between the meaning bearing morphemes. Punctuation and intonation are also pattern markers. The third type of syntactic information involves transformational rules. K. Goodman states that these are not characteristic of the graphic input itself, but are supplied by the reader in response to what he perceives as surface structure. They carry him to the deep structure and meaning.

Although the psychological reality of transformation rules as cues to meaning is questionable, there is little doubt among theorists that the syntactic structure of written language is vital to meaning. Empirically, however, there is far less support for this contention. The remainder of this section will review research which has attempted to explore the relationship between reading comprehension and syntactic structure.

Research on Readability. Most of the early research which considered the language variable in written materials involved readability, with readability usually defined as ease of understanding. The earliest published studies in readability estimated difficulty on the basis of one factor, vocabulary (Chall, 1958). The first awareness of the importance of language structure in readability came in 1928 when Washburne and Vogel published the Winnetka formula for reading material from grades three to eight. Their readability formula took into account the number of different words in a sample of 1000, the number of prepositions, the number of words not occurring in the Thorndike list, and the number of simple sentences.

Sentence structure was also considered by Gray and Leary (1935). Concerned with predicting the difficulty of material for adults, they began with 82 factors and from these selected the smallest number which would give as good a prediction as possible. They included the following factors: number of different hard words; number of first-, second- and third-person pronouns; percentage of different words; average sentence length in words; and number of prepositional phrases.

Lorge (1944), concerned with children's books, reduced the number of factors to three--number of different hard words, average sentence length in words; and number of prepositional phrases. Subsequent work in readability has emphasized vocabulary and the only recognition of language structure which has been included is sentence length.

In 1953 Taylor published what he referred to as The Cloze Procedure: A New Tool for Measuring Readability. This measure did not isolate and count factors, but instead allowed all of the potential factors to remain in the text and to interact with one another. Hence, syntactic structure is involved implicitly in this measure of readability rather than explicitly, and it is allowed to function as it normally does in a language situation. The cloze technique will be considered in further detail in a subsequent section.

Other Studies on the Syntactic Structure of Written Material and Comprehension. A small number of studies, other than those concerned with readability, have attempted to investigate the relationship between the syntactic structure of written language and reading comprehension. Ruddell (1963), operating within a structural linguistic framework, found that the reading comprehension of grade four pupils was significantly higher on passages using high frequency patterns of their oral language in contrast to passages using low frequency and more elaborated constructions.

Tatham (1970) extended Ruddell's findings to the second-grade level. She found that children at both the second- and fourth-grade levels comprehend material written with frequent oral language patterns better than materials written with infrequent oral language patterns.

The difference between reading comprehension of frequent and infrequent patterns was greater for second than fourth graders.

A study by Denner (1970) attempted to investigate the ability of problem readers to handle syntax in written material. Four tasks taken from a study by Farnham-Diggory were presented. The first task, the enactive, determined whether or not the child knew the meanings of selected simple verbs, nouns and prepositions. The second, the pictograph task, assessed the child's understanding that pictures could represent things. The third, the logograph task, tested the child's representational competence by teaching him to associate the same words with abstract forms. The last task involved synthesis of the separate logographs. Denner's sample included first-grade problem readers, first-grade average readers, third- to fifth-grade problem readers and Head Start preschoolers. He found that problem readers and Head Start children were as competent as average readers on the first three tasks, but that they were significantly less competent in synthesizing whole sentences from individual linear forms. Denner suggested from his results that these children do not read sentences, but a series of individual words. Unfortunately, Denner's logographic sentences contained a minimum of syntactic cues and all were imperatives, for example, Clap over block. It may be more correct to suggest that problem readers need syntactic cues present in order to synthesize words in sentences, than to say they lack syntactic competence.

The effect of syntactic structure on the synthesis of words for comprehension was clearly demonstrated with college students in a recent study by Latham (1973). He evaluated the relationship between grammatical structure and simultaneous synthesis by presenting subjects with written materials chunked in a variety of ways. Words were presented in a normal format, a two word format, a long non-meaningful format, a short meaningful format (lower major constituents) and a long meaningful format (higher major constituents). Lower major constituents were formed by applying a linguistic algorithm to the surface structure of written language, and higher major constituents were formed by combining lower major constituents. Latham found that for good college readers, formats using small or large grammatical chunks were comprehended at significantly higher levels than formats consisting of non-grammatical chunks. However, good readers were able to comprehend materials presented normally as well as that presented in grammatical chunks and Latham concluded that good college readers synthesize words in continuous discourse into meaningful grammatical units. For the majority of poor readers, comprehension of material presented in grammatical chunks was higher than that for any other format. These pupils read at an equivalent level when material was presented normally or in long or short non-meaningful units. Hence, Latham concluded that poor college readers probably process written language in a word by word manner. When grammatical units are delineated for them, however, comprehension is substantially improved.

These studies have indicated a relationship between syntactic patterns in written language and reading comprehension, but they have not considered language structures as they occur in the child's reading material at school and the effect of these structures on his comprehension. One of the first to do this was Robertson (1966). Using a modified transformational generative grammar, she investigated the understanding in reading which children in grades four, five and six have of connectives that occur in basal readers. Results revealed an increase in pupil understanding of these connectives from grades four to six. A significant relationship was found between the understanding a child has of connectives and his reading achievement. Of particular interest in relation to the present study was Robertson's inclusion of the absent that (a deletion produced structure). This connective was not among the most difficult of the connectives considered.

Another study within the transformational generative grammar framework was that conducted by Fagan (1969). He investigated the relationship between reading comprehension and the number and types of sentence transformations in basal reading material. Subjects were children in grades four, five and six between the ages of nine and twelve. Sentence, passage and transformation difficulty was assessed by the cloze technique. Forty-three transformation rules were identified from an analysis of grade four basal readers and these were grouped into categories of embedding, conjoining, deletion, simple and position shift transformations. Results showed that the presence of Embedding and Deletion transformations was significantly correlated with difficulty of sentences and passages. Sentence and passage difficulty was more dependent on the difficulty of Simple transformations than on their presence and Conjoining transformations were relatively easy. Sentence difficulty was more dependent on the presence and difficulty of transformations than was the difficulty of the passages. Fagan suggested that this resulted from redundancy in the language.

Although deletion transformations as a group tended to be related to sentence and passage difficulty in Fagan's study, this was not true of every deletion transformation in this category. In agreement with

Robertson's findings, the absent that preceding object complements was among the 15 easiest transformations included in the study. All of Fagan's deletion transformations involved embedded or conjoined sentences and embedded sentences were also found to be related to sentence and passage difficulty. Hence, it was impossible to determine from the results of his study whether the difficulty of sentences derived by deletion transformations was the result of the deletion operation or related to some other factor such as embedding. Since deletion produced structures were very difficult to comprehend, however, they appeared to warrant further investigation.

Support for the difficulty of one of the deletion transformations in Fagan's study has been presented by Foder and Garrett (1967). They conducted a study in which subjects were presented with embedded sentences in which the relative clause was introduced by a relative or without a relative. Sentences in which the embedded clause was introduced by the relative were more easily paraphrased and the reaction time to give the paraphrase was shorter than for those without the relative. This deletion transformation involves deletion of a specific syntactic marker.

This section has not attempted to present an exhaustive survey of literature in this area but only that most pertinent to the present study. This research has supported a strong relationship between syntactic structure of written material and reading comprehension, and there is some indication that sentences derived by deletion transformations are difficult to comprehend.

The Cloze Technique as an Indicator of Comprehension

The cloze procedure, as indicated previously, was first used as a readability measure. To construct a cloze test, passages were prepared by deleting words by some objectively specifiable process. Words deleted were either all those of a particular type (lexical or structural) or every n^{th} word. Deleted words were replaced by blanks of equal length and subjects asked to write in the missing words.

Taylor (1956) soon realized that as well as readability, the cloze could be used to measure reading comprehension. Jenkinson (1957) was among the first to make use of this instrument as a comprehension measure. She felt that it was less a measure of product and closer to a measure of the comprehension process than traditional tests.

In a recent critical analysis of comprehension tests, Simons (1971) suggested that the cloze is a better measure of reading comprehension than traditional tests because it appears to measure fewer of the extraneous aspects of student functioning such as memory, ability to understand questions, and familiarity with the content of the passage. He also felt that the mechanical procedure used in developing the test renders it more objective than traditional tests.

In considering test length, Taylor (1956) suggested that cloze tests include 50 items to ensure a representative sample of items. Bormuth (1964) examined the different cloze forms particularly with respect to their reliability in measuring the comprehension difficulty of passages. Maintaining a constant rate of deletion, every fifth word, he varied the starting point to produce the five possible forms for each of 20 passages. Differences were found between means of the various forms and he concluded that one should not use only a single cloze test form over a given passage, especially if precise determination of passage difficulty is required. His results also confirm Taylor's finding that a cloze test of less than 50 items is unreliable.

The validity and reliability of cloze as a comprehension measure has been established at college, secondary and upper elementary levels (Jenkinson, 1957; Weaver and Kingston, 1963; Bormuth, 1969). Only two investigators have extended the cloze test into the primary grades.

Gallant (1965), in a study to determine the validity of cloze tests as a reading comprehension measure for pupils in grades one to three, compared the ranking of pupils within each grade on the paragraph reading section of the Metropolitan Achievement Test with the ranking of these pupils on the same section of a comparable form rewritten as a cloze test. A modified cloze test was prepared for first-graders in which a choice of three responses appeared for every deleted word. Correlations between the standardized reading test scores and those obtained on the cloze tests ranged from .65 to .81 and were significant at the .01 level of confidence. Internal reliability coefficients ranged from .90 to .97. Gallant concluded that the cloze is a valid and reliable measure of reading comprehension for beginning readers.

Ransom (1968) compared performance on the cloze test and informal reading inventory for children from grades one to six. The material for content in both instruments was selected from the same basal series. Ransom found correlations between cloze and informal inventory scores at the instructional and frustration reading levels to be statistically significant for pupils in grades two to six. For first graders, the relationship between cloze and informal inventory scores was not significant at the .01 level of confidence. Ransom suggested that this relationship may have been higher if the tests had been given later in the school year.

Except for the results obtained by Ransom, the cloze test appeared to be ideally suited to serve as a measure of comprehension in the present study. First, since deletions involve both structural and contentive words, cloze scores give an indication of the subjects knowledge of the content of the passage and the interrelationships of ideas. Second, it has the advantage that the difficulty of every word, phrase and sentence can be measured so that difficulties in comprehension can be pin pointed. Third, cloze responses can be classified for semantic and grammatical acceptability (Bormuth, 1965; Fagan, 1969) to give some indication of semantic and syntactic strategies used by readers. Finally, the cloze technique involves either mechanical or selected deletions and hence, could be used to measure both comprehension and recoverability of deleted elements.

The present study involved both first- and second-grade pupils and since a regular cloze test was not found by Ransom to be a valid and reliable measure of comprehension, it was necessary to modify the cloze technique for pupils in grade one. Gallant's modified cloze technique was not used because, by limiting a child's choice, the possibility of making inferences regarding strategies being used as he reads is reduced. An oral response to the cloze appeared to be well suited to the needs of this study and the validity and reliability of such a modification was investigated in the pilot study.

III. SUMMARY

Reading, in the acquisition stage, is viewed as a two stage process involving identification of graphic symbols and comprehension. Meaning is seen as the interaction of meaning potentialities of words, semantic and syntactic context and the situational frame of reference. Neither word identification or comprehension are viewed as passive unit by unit processing but rather as constructive language processing activities. Writers in the field of reading feel that syntactic structure reduces the amount of graphic information necessary to predict word identification or meaning.

Studies of oral reading miscues have shown that from the beginning the child brings his knowledge of language to the printed page. These studies and those on the relationship between the syntactic structure of written material and reading comprehension substantiate the view that syntactic structure plays a vital role in reading and suggest that sentences derived by deletion transformations are difficult for children to read accurately or with adequate comprehension.

There is general agreement that word identification is a prerequisite for comprehension in oral reading at the beginning level and hence, oral reading was used as a measure of word identification in the present study. The cloze technique, modified at the first-grade level, was considered well suited to the needs of this study as a measure of reading comprehension.

CHAPTER III

BACKGROUND OF THE STUDY: LINGUISTIC THEORY AND CHILDREN'S SYNTACTIC FUNCTIONING

Weiner and Cromer (1967) feel that one of the issues which has led to confusion in the area of reading and reading research involves the distinction of reading and language skills. It is difficult to avoid this confusion when reading is viewed as a language processing activity. This study is specifically concerned, however, with the effect that manipulation of one aspect of syntactic structure in written language has on the word identification and comprehension of beginning readers.

Syntactic structure is being considered within the theory of transformational grammar. This theory will be briefly discussed and then the psychological reality of such a grammar will be considered to indicate the position taken on this issue in the present study, and because some of the data collected have direct bearing on this problem.

Since beginning readers are viewed as bringing their knowledge of language to the printed page, the syntactic functioning of children at this age level will be briefly discussed with particular reference to production and understanding of deletion produced structures. The relationship of syntactic functioning and reading achievement will also be considered.

I. TRANSFORMATIONAL GENERATIVE GRAMMAR

Over the past two decades transformational grammar has had a great deal of impact in linguistics and controversy between traditionalists and transformationalists continues to rage. The basic distinctions between transformational grammar and past approaches have been gleaned from the literature by Derwing (1973). He notes that linguistics is no longer considered to be a classificatory science but an explanatory one in the sense of formulating a universal theory of language yielding an explicit explanatory theory of the structure of language. Explanatory power and simplicity serve as major criteria for judging the value of a grammar. In addition language is no longer viewed as a collection of utterences but rather the abstract system which underlies these utterences, and the data for linguistic analysis consists of not only speech forms but intuitions of native speakers as well.

Chomsky (1965) maintains that traditional grammars are deficient in that they leave unexpressed many of the basic regularities of the language with which they are concerned. Traditional or structural grammars do not go beyond the classification of particular examples and hence, although they may contain full and explicit lists of exceptions and irregularities, they provide only examples and hints concerning regular syntactic processes (combinatorial arrangements) rather than explicit statements ("rules") of the regularities. A second deficiency, according to Chomsky, involves the absence in these grammars of any technical device for expressing recursiveness, with the result that these grammars cannot account for the infinitely large number of sentences which are possible. Chomsky claims that transformational grammar overcomes both of these faults.

Empirically, transformational grammar appears to have greater discriminatory power than structural or traditional grammars in the sense that analyses of children's language within this framework have been able to show clearcut differences between age-grade levels. Bougere (1968), for example, noted that in contrast to studies conducted within the structuralist framework, those within the transformational approach have found significant developmental trends in production of syntactic structures by children.

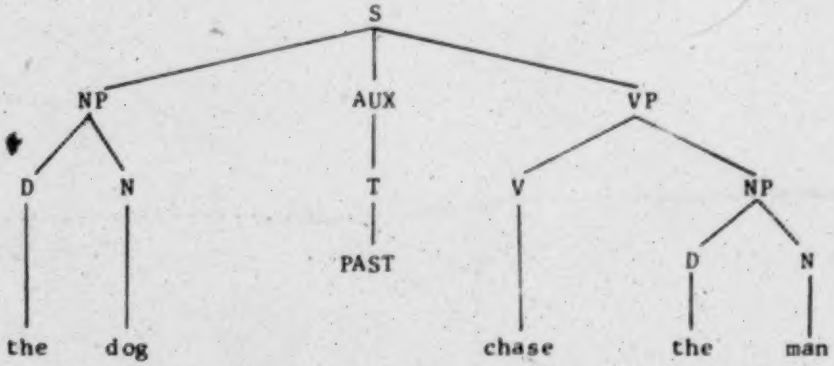
Chomsky's Transformational Grammar

A generative grammar in Chomsky's terms (1965) involves a system of rules which can generate an indefinitely large number of sentences. This system of rules can be analysed into three major components of a generative grammar: the syntactic, phonological and semantic components. The syntactic component specifies for each sentence a deep and surface structure. The deep structure enters into the semantic component and receives a semantic interpretation, and the surface structure is given a phonetic interpretation by rules of the phonological component. Both the phonological and semantic components are purely interpretive since they use information provided by the syntactic component of the grammar.

The syntactic component consists of a base and a transformational component. The base will be considered only briefly since the main concern of this study is the transformational component. The base consists of a categorial subcomponent and a lexicon, and these together generate the deep structure of sentences. The categorial subcomponent of the base involves a set of rewriting rules whose function is to establish dominance relationships that determine semantic interpretation (grammatical relations) and to specify an underlying order of constituents. These rewriting rules are of the form $A \longrightarrow Z$ which means "A is rewritten as Z". The underlying dominance and ordering relationships for the sentence the dog chased the man could be generated by the following set of categorial rules.

S → NP⁀AUX⁀VP
VP → V⁀NP
NP → D⁀N
AUX → T

These would produce the following phrase marker.



Although lexical items are shown in the above phrase marker, they would actually not be inserted until other rules in the base had added syntactic features and contextual constraints to determine whether or not the particular item could fit. Once lexical insertion has been made, the transformational component would convert this abstract underlying deep structure into a surface structure.

A transformation rule consists of three parts: a structural description which describes the elements and the order in which they must occur in a string before a transformation rule can apply; a structural change which indicates the change the transformation effects upon the string; and conditions on application of the rule. One of these conditions involves whether the transformation rule is obligatory or optional. If a transformation rule is obligatory, it must apply to every derivation in which the structural description is met; otherwise the result will not be grammatical. An optional transformation does not have to apply when its structural description is met and the result will still be grammatical.

Chomsky originally suggested that the set of elementary transformations or operations included permutations, substitutions, deletions, and adjunctions (Chomsky, 1957). By 1965 he had decided that permutations were unnecessary. Descriptions of each of the remaining three are presented below.

1. Adjunction: In an adjunction transformation one constituent is adjoined to another constituent.

$$\begin{array}{llll} \text{SD:} & X & Y & Z \\ \text{SC:} & 1 & 2 & 3 \longrightarrow \\ & 1 & \overset{\frown}{2\;3} & \emptyset \end{array}$$

2. Deletion: In a deletion operation an item is removed from a string.

$$\begin{array}{llll} \text{SD:} & X & Y & Z \\ \text{SC:} & 1 & 2 & 3 \longrightarrow \\ & 1 & \emptyset & 3 \end{array}$$

3. Substitution: By substitution one constituent replaces another.

$$\begin{array}{llll} \text{SD:} & X & Y & Z \\ \text{SC:} & 1 & 2 & 3 \longrightarrow \\ & 1 & W & 3 \end{array}$$

Transformation rules may involve one or more of these three elementary operations.

Recursiveness is introduced into the grammar to account for the infinite number of sentences possible through two sources. The first involves embedding of sentences inside various constituents of other sentences. Rules in the base component introduce the initial symbol S in designated positions in strings of category symbols. Burt (1971) indicates that two types of complex sentences are formed this way. The first involves embedding of a relative clause and the second embedding of complement structures. The second source of recursion is the conjunction of sentences. Conjunction of two or more sentences arises from rules in the transformational component of the grammar. As Lakoff and Peters (1969) and Smith (1969) point out, however, it is necessary to account for phrasal conjunction and they postulate rules in the base component for this purpose.

In 1957 Chomsky postulated that structural forms such as interrogatives and negatives were produced by transformation rules from kernal sentences (for example, from those strings which underlie simple sentences). Through development of the semantic component by Katz and Fodor (1963) and Katz and Postal (1964), it became apparent that if the deep structure enters the semantic component for interpretation, transformations would have to be meaning preserving. Katz and Postal suggested that transformations could not introduce meaning bearing elements nor could they delete lexical items without leaving a trace. This led to Chomsky's stipulation that all deleted elements must be recoverable. In 1965 he proposed the following convention to guarantee recoverability of a deletion:

> A deletion operation can eliminate only a dummy element, or a formative explicitly mentioned in the structure index (for example, you in imperatives), or the designated representative of a category (for example, the wh-question transformations that delete Noun Phrases are in fact limited to indefinite Pronouns...), or an element that is otherwise represented in the sentence in a fixed position. (p. 145)

The last possibility involves the common elements deletion, and Chomsky indicates that it cannot apply unless the elements are identical. However, in further discussion, he suggests that identity does not mean having identical features. Only those features inserted by the base component must be identical, not those added by transformation rules. From this interpretation, it is the features added by transformations which are determined from context, and which are recoverable even if deleted.

Transformations, within the framework of Chomsky's transformational grammar, basically express generalizations about regularities and relationships in the language (Bach, 1964). They indicate relationships among sentence classes or types (such as the active and passive). In this study, transformations are viewed as a formal device of the grammar which partition sentences into classes on the basis of their relationships. Language users appear to know these relationships among sentences but no claim is made that they derive sentences in the same way as they are generated in the linguistic grammar.

Alternate Approaches to Transformational Grammar

Several writers do not feel that an autonomous syntactic deep structure can be motivated by recourse to linguistic data. Rommetveit (1968) considered several sentence pairs presented by writers in the Chomskyan tradition as illustrations that deep structure is necessary and concluded that the differences in meaning claimed to be due to deep structure are always reflected in word meanings, specifically in word reference and related syntagmatic associative potentialities. For example, he maintains that the difference between John is eager to please and John is easy to please resides in differential semantic and syntagmatic properties of the words eager and easy. "Ease or difficulty is determined by the capacity of some agent relative to the requirements of some task, but always attributed to the task. Eagerness, on the other hand, is attributed to the agent rather than the act or task." (p. 215) Rommetveit feels that the linguists' description of deep structure is an attempt to capture within linguistic theory phenomena which are basically psychological in nature.

Prideaux (1972), in a consideration of one case of ambiguity, demonstrated that an autonomous deep structure is not necessary to resolve structurally ambiguous sentences. Transformationalists suggest that structurally ambiguous sentences have as many deep structures as there are meanings. Prideaux proposed that structural ambiguity in selected sentences could be resolved by surface structure labelled bracketing. He argued that since disambiguation is possible at the surface structure level by distinct labelled bracketings and sentences were different only in meaning, the level of deep structure seems superfluous. He suggested that in addition to labelled bracketing, only a notion of semantic representation and paraphrase is necessary to resolve ambiguity.

Harris (1970) has developed a theory of transformational grammar without recourse to deep structure. Language structure, in his theory, consists of a set of kernal sentence forms and a set of transformations.

Every sentence in the language can be analysed as the sum of one or more base sentences each undergoing one or more transformations in accordance with stated rules of application. Kernal sentences are seen as short and of simple form, composed mostly of concrete nouns, verbs and adjectives. Linguistic transformations are seen as equivalence relations among sentences or constituents of sentences. Transformations occur when "conditions of their argument" (p. 540) are met and they preserve the acceptability ordering of words from elementary sentences into all others.

Harris finds four elementary transformations necessary to account for equivalence relations among sentences: increments (adjuncts, sentence operators, connectives); morphophonemic zeroing of redundant words; extensions of the above to new subclasses; and permutations. Zeroing of redundant information is similar to Chomsky's elementary deletion operation. Since only material that is redundant and can be determined is dropped, Harris suggests that the material is still morphemically present but that the phonemes have become zero. Material zeroed carries no information and hence, this operation varies only the style or subjective character of sentences but not the meaning.

Transformational analysis within Harris' theory yields a decomposition of sentences into kernal sentences and operators on them. It groups sentences which have the same kernal or the same transformation. Sentences within this view are related by elementary operations without one being derived from the other; the difference between them is the sum of elementary operations.

Harris' conception of transformations as equivalence class relations among sentences is much closer to the view taken in this study than is Chomsky's derivational theory. All sentences which involve optional zeroing of redundant material are being grouped on the basis of involving a common operation. Deletion produced structures are not being viewed as derived from other sentences but as belonging to an equivalence class with sentences in which zeroing has not occurred. The effect of zeroing redundant material on word identification and reading comprehension is the major thrust of this study.

Unlike Harris, several other theorists springing from the transformationalist tradition wish to retain a deep structure level but this component is seen as involving underlying semantic rather than syntactic structures. Fillmore (1968), for example, advocating a case grammar, sees the deep structure or propositional component of every sentence as an array consisting of a verb and a number of noun phrases each holding special case relations to the sentence. Deep structures are converted to surface representations through a series of rules. Generative semanticists such as McCawley (1968) and Chafe (1970) also advocate a semantic deep structure and this deep structure is much more abstract than that postulated by Chomsky. Although this direction of research may eventually result in many insights into linguistic relationships, the primary interest in this study is in syntactic structure. For the purposes of this study, transformation rules will be interpreted from Harris' theoretical position using Chomsky's notation.

II. ON THE PSYCHOLOGICAL REALITY OF TRANSFORMATIONAL GRAMMAR

An area of controversy which surrounds all studies of performance involving the transformational generative grammar model is the performance-competence distinction. Chomsky attempts to make clear in Aspects of the Theory of Syntax (1965) that his model of generative grammar is a competence model. His grammar purports to be a description of "the idealized speaker's intrinsic competence" (p. 4). It attempts to characterize the knowledge of the language that provides the basis for use of language by a speaker-hearer, but it is not a model for actual use of language by a speaker-hearer.

> When we say that a sentence has a certain derivation with respect to a particular generative grammar, we say nothing about how the speaker or hearer might proceed, in some practical or efficient way, to construct such a derivation. ...generative grammar does not, in itself, prescribe the character or functioning of a perceptual model or a model of speech production. (p. 9)

Despite Chomsky's insistence that his grammar is not a performance model, many investigators, particularly in psychology, have interpreted it as such and have attempted to provide evidence for the psychological reality of transformational grammar. The basic postulate underlying most of these investigations has been that actual speech behaviour is some regular function of the abstract linguistic structure in transformational grammars (Bever, 1970). This has been formalized as the derivational theory of complexity which states that the psychological complexity of a sentence is directly related to the number of transformation rules required to generate it (Fodor and Garrett, 1966).

In 1966 Fodor and Garrett critically reviewed research studies conducted to that time to test the psychological reality of transformational grammar and concluded that derivational complexity in terms of number of rules applied does not correspond in any simple way to the psychological complexity involved in understanding sentences.

Hence, they indicated that transformational grammars could not be actual components of the routines by which sentences are processed. They based their conclusions on the fact that several experiments obtained negative results between derivational and psychological complexity and that many of the studies which did obtain positive results were restricted to a narrow range of grammatical relations and frequently confounded derivational complexity with other variables such as sentence length or meaning. They noted in particular that transformation rules which deleted internal structures did not necessarily involve added complexity.

A more recent review of the literature was undertaken in 1969 by Fagan and essentially the same conclusions were drawn. Investigators had failed to define their terms and sentence difficulty was still being assessed in a wide variety of ways. He concluded that evidence for or against the derivational theory of complexity was, at most, conflicting.

In 1970 Bever, who feels that recent research has been too narrow by isolating language structure from the rest of cognitive development, reviewed experimental work from within this wider perspective. He drew the conclusion that "behavioral processes manipulate linguistically defined structures but do not mirror or directly simulate the grammatical processes that relate those structures within a grammar" (p. 342). Grammatically defined structures may be reflected in speech behaviour but not grammatically defined processes. Bever maintains instead that speech production and perception are more dependent on behavioural and perceptual strategies than on a primitive mechanism or sophisticated structural knowledge, and that speech perception also affects adult linguistic structures. He suggests that children use strategies of segmentation, semantic labelling, sequential labelling and lexical potentialities simultaneously to isolate potential internal actor-action-object modifier sentence units and to assign the functional relations within these units. Semantic cues appear to be dominant since structural factors do not affect the psychological complexity when semantic relations are unique (strong semantic constraints). Structural strategies

> project segmentation and internal structural labelling on the basis of general sequential properties of actual sequences (for example, "NVN" in the surface structure corresponds to underlying subject-verb-object, or "SVO"), or on the basis of the particular internal/external potential of individual lexical items. (p. 302)

From this view of children's processing strategies, Bever suggests that deletions may cause difficulty, not because of the number of rules applied, but that sentence complexity is related to the amount of internal structure material that is implicit in the external structure since the child must contribute more information to the sentence himself.

Since there is little basis for assuming the psychological reality of transformational grammar, the present study is based on the assumption that transformational grammar provides an adequate description for generating sentences of the language, but that it does not describe the way language is produced or understood. Latham's study (1973) has shown that college students synthesize written language in chunks corresponding to surface structure grammatical constituents without recourse to deep structure. Hence, transformational grammar is being considered as a logical systematic description of language structure, and is used to define the set of deletion transformations involved in the study. The actual strategies used by children to process language are still largely unknown.

II. SYNTACTIC FUNCTIONING OF BEGINNING READERS

Although this study is not specifically concerned with oral language processing, it is highly unlikely that production and perception can be divorced. Studies by Ruddell (1963) and Tatham (1970) have shown that children are able to comprehend written material with frequent oral language patterns better than that with infrequent patterns. Children are being viewed as actively using their language knowledge when identifying words and meaning and hence, the syntactic functioning of beginning readers and the relationship between this functioning and reading achievement will be discussed.

Language Development

Early studies summarized by McCarthy (1954) presented observations on gross aspects of language development and concluded that by the time children reach school, they use complex, compound and compound-complex sentences. Language development was thought to have become asymptotic to a mature level of linguistic ability by about age five.

Strickland (1962), operating within a structuralist linguistic framework, analysed the syntactic structure of oral language for pupils in grades one to six. She found that children at all grade levels used a wide range of language patterns but that there were few significant differences between age-grade levels. Loban's (1963) study also found few differences between age-grade levels in structural patterns but he did note differences between high and low language groups in what is done to achieve flexibility within the patterns.

McNeil (1968) and Cairns and Silva (1969) summarized recent work on language acquisition within the transformationalist tradition and concluded that by the age of five, the child has mastered the essential syntactic elements of his language.

Some studies conducted with children beyond age five from a transformationalist viewpoint, however, have indicated that syntactic mastery is not complete by this age. Menyuk (1963) collected language samples from nursery school and first-grade children, and identified simple and sentence combining transformations in their speech. She found that though all types of transformations identified in the speech of first-grade children were used by at least a few nursery school children, some types were used significantly more often by first graders. The reverse was never true.

O'Donnell, Griffin and Norris (1967) collected language samples from 180 children from kindergarten to grade seven. Responses were divided into communication units, each of which was analysed for the type of sequential pattern of the main clause and for the number, kind and function of sentence combining transformations. The investigators did not find differences between age-grade levels in relative use of basic structures in main clauses. There were, however, significant overall increases across grades in the use of whole classes of transformationally producud nominals, adverbials and coordinations within communication units. Greatest overall increases were found for those constructions produced by deletion rules.

Development of syntax until at least age 10 was confirmed by Carol Chomsky (1969) in a case study of several aspects of the acquisition of syntactic structures in children between ages five and 10. She interviewed each child in her sample, having them carry out tasks and answer questions to reveal knowledge of syntax. The following four structures were chosen as candidates for late acquisition: John is easy to see; John promised Bill to go; John asked Bill what to do; and He knew that John was going to win the race. The first two structures were acquired between ages five and one-half and nine, and were known by all children aged nine and older. The third structure was imperfectly learned by some children even at age 10 and the last one was acquired fairly uniformly at about age five and one-half.

It is possible, then, that differences may exist between children's syntactic level of functioning and the grammar used by authors of children's reading materials. An important question, however, is whether or not these differences involve deletion produced structures. The study by O'Donnell,Griffin and Norris has suggested that they probably do. Menyuk (1969) has provided further information on this in a study of children from age three to seven. She noted imperatives very early in her sample (age two years, 10 months) but felt that it was unlikely that these early imperatives were the result of the deletion of you. They appeared instead to be similar to other emphatics such as Mommy try it!. She also noted occurrence of the following deletion produced structures: that deletion in object complements; WH + BE deletion; passive truncation; common elements deletion, particularly deletion of the noun phrase + verb; and deletion of the marker to in the infinitival complement construction. In terms of overall findings Menyuk indicated that the order of usage of operations seemed to be addition, deletion, substitution, permutation, embedding and nesting. However, she was careful to note that the use of some operations does not guarantee that all structures which involve the operations are used at the same time and with the same frequency. In spite of this, her results clearly verify use of at least some deletion produced structures by beginning readers.

R. Brown and Hanlon (1970) also noted several truncated sentence forms in language samples taken from three preschoolers. They found that the order of usage of these forms was simple truncate (we did), truncated questions (did we?) and truncated negatives (we didn't), and finally truncated negative questions (didn't we?).

Very few investigators have considered children's comprehension of deletion produced structures. One exception is a study by H. Brown (1971) who investigated the aural comprehension of pupils aged three to five on relative clauses. Children were required to match sentences heard with appropriate pictorial stimuli. The difficulty of four relative pronouns, who, who-deletion[1], which and that, was also investigated. Results showed that many relativized sentences were not adequately understood even by five-year-olds. The pronouns who and who-deletion did not differ from each other in terms of difficulty, nor did which and that, but the first two were significantly harder than the latter two. Although Brown investigated only one deletion produced structure, results do not suggest that deletion had a significant impact on sentence comprehension.

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[1] Brown's who-deletion is similar to the WH and WH + BE deletions considered in this study although it was restricted to who.

Syntactic Functioning and Reading Achievement

A small number of studies have been concerned with the relationship between children's production of syntax and their reading achievement. Two early studies within the structuralist tradition found a significant relationship throughout the elementary grades between the structures in pupils oral language and their reading achievement (Strickland, 1962; Loban, 1963).

Fry (1967) attempted to use Chomsky's grammatical model to investigate differences in the oral language structures of second-grade children who were average readers and those below average. She found that the below average readers used more contractions, more nominal compounds, violated subject-verb agreement in number more, and used an 'existence' sentence (*there* + *be*) more often than average readers. Average readers used more transformation rules and more transformation rules per communication unit.[1] Differences between the reading groups were not significant for the two deletion transformations included in her study.

Bougere (1968) analysed the oral language of 60 first graders to find the relationship between specific factors in oral language and beginning reading achievement. To measure syntactic competence, she used several of the indices employed by O'Donnell, Griffin and Norris, including ratio of sentence combining transformations to communication units. Her results showed that none of the language measures predicted reading achievement as accurately as a standardized readiness test, but the predictive value could be increased by the addition of certain of the measures alone or in combination.

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[1] A communication unit refers to a grammatically independent predication with its modifiers.

A secondary purpose in a study by Braun (1969) was to consider the oral syntactic functioning of first-, fourth- and sixth-grade pupils in relation to reading achievement. He, too, used measures from the O'Donnell, Griffin and Norris study. He considered high and low sentence combining transformation levels and found that there was a significant difference in total reading achievement between these levels at the grade one level. Differences were not significant for fourth and sixth graders.

C. Chomsky (1972) looked at beginning readers not in terms of skill development but rather at the ways in which children put their reading skills to use. She employed Huck's Taking Inventory of Children's Literary Background and interviews with the children and their parents to get at reading habits. Results showed significant relationships between the syntactic level of a child and scores on Huck's inventory as well as on several informal measures such as the number of syntactically complex books read by the child.

The above studies have only begun to explore the relationship of syntactic functioning and reading achievement and, as yet, few conclusions can be drawn. It appears, though, that oral syntactic level is related in some way to reading achievement. Some have suggested that one source of reading difficulty may be a mismatch between the reader's oral language and that of the material being read (Weiner and Cromer, 1967). Robertson (1966) has shown, however, that even when there is a match, children may use constructions in their oral production which they are unable to comprehend in written language. Weber (1970) suggests that texts for beginning readers with their limited vocabulary, short sentences and short texts don't begin to reflect the complexity of any child's spoken language, and hence, every child who faces reading for the first time faces a new variety of his language.

V. SUMMARY

The present study is linguistically based within the framework of transformational grammar. The theoretical positions of both Chomsky and Harris have been taken into consideration. Transformational rules are viewed as formal devices in the grammar which express relationships among sentences or, in other words, as equivalence relations among sentences.

Research has produced conflicting results regarding the psychological reality of transformational grammar and hence, no claim is made that this grammar reflects the way language is produced or perceived. It seems likely that recourse to psychological strategies will be necessary in any explanation of language processing.

Although many investigators suggest that children have mastered the basic syntactic elements of their language by age five, some studies show that development of syntactic competence continues beyond this time. Deletion produced structures have been found in the oral language of preschool children but an increase in use of these structures over age levels has been noted. Research has generally demonstrated a positive relationship between oral syntactic production and reading achievement.

CHAPTER IV

THE EXPERIMENTAL DESIGN

This chapter will describe the design of the study. It will include a description of the test population and test sample, the selection and analysis of primary reading material, the test instruments, the administration and scoring of the tests, and the analysis of the data.

I. THE DESIGN OF THE STUDY

The major purpose of this study was to investigate the effect of deletion produced sentence structures, as defined by transformational grammar, on the word identification and comprehension of first- and second-grade children. In order to achieve this purpose, the study was conducted in two stages. The first stage involved simultaneous analysis of sentences in primary reading material and formulation of the set of deletion transformation rules to be investigated. The second stage involved collection and analysis of data.

The research design for this study evolved from the analysis of basal readers, formulation of deletion transformations and subsequent construction of test instruments. Research tests were developed to assess the effect of deletion produced structures on word identification and comprehension and to assess recoverability. Eight test passages were constructed at each grade level with 16 forms of each. This resulted in 256 research tests, the construction of which is described in Chapter V.

Since the results would be contaminated by having any subject read the same passage more than once, 16 groups were required at each grade level and a counterbalanced research design was used. Groups of 10 were formed by administering a standardized reading test and randomly stratifying the sample at each grade level on the basis of the results of this test.

Eight passages were used to provide eight test sentences for each transformation rule and to create a fully balanced research design. Each group read one form of each of the eight passages. Figure 2 shows how these forms were administered at each grade level so that forms were counterbalanced across experimental groups for both versions of the research instruments.

II. THE SAMPLE

The population from which the test sample was drawn involved grades one and two pupils from seven elementary schools in a suburban area. This area was deliberately selected because the pupils were reading an alternative reading series to the one being used for the test passages. It was felt that if pupils had already read the stories involved, the cloze test would be assessing memory as well as comprehension. One elementary school withdrew its first-grade pupils from the study because they had recently been involved in another study. This resulted in a population of 308 first graders and 472 second graders. From each grade level, 160 pupils were randomly selected using a table of random numbers. An additional five pupils were selected at each grade level to serve as alternates.

	VERSION I								VERSION II							
	GROUPS								GROUPS							
PASSAGE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
I	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5
II	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4
III	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3
IV	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2
V	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1
VI	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O
VII	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1	R_2
VIII	R_2	O	C1	C2	C3	C4	C5	R_1	R_2	O	C1	C2	C3	C4	C5	R_1

R_1 = Multiple Choice Recoverability R_2 = Cloze Recoverability O = Oral Reading
C = Cloze Tests

FIGURE 2

DESIGN OF THE STUDY

Chronological Age and Sex of Subjects in the Test Sample

The mean chronological age of the grade one sample was 82.0 months and of the second-grade sample 94.3 months. There were 78 boys and 82 girls in the first-grade sample and an equal number of boys and girls at the second-grade level.

Stratification of the Sample on the Basis of Reading Achievement Scores

Pupils in grade one were administered the Gates-MacGinitie Reading Test, Primary A, Form 1, and pupils in grade two the Gates-MacGinitie Reading Test, Primary B, Form 1. At each grade level standard scores were obtained from norms provided in the appropriate teacher's manual for the Gates-MacGinitie tests. Standard scores were used because they are based on an equal-interval scale and hence, can be used for obtaining averages. The standard scores for vocabulary and comprehension for each child were averaged to provide a composite reading achievement score.

After administration of the Gates-MacGinitie test to the first graders, it was apparent that several were still essentially non-readers. Although a wide range in reading achievement representative of a normal first-grade population was considered desirable, it was obvious that several pupils would be totally unable to cope with the tasks to be completed. Since test materials were presented at a first-reader level, an attempt was made to eliminate all pupils reading below a primer level. A scaled score of 35.5 was selected as the cut-off point and all pupils with scaled scores of 35.5 and below were eliminated from the study. This affected 12 pupils. Additional pupils were then selected randomly from the population and administered the

Gates-MacGinitie Reading Test, Primary A, Form 1. No pupils in the second-grade had to be eliminated because they were non-readers.

Each grade sample was then stratified into 16 groups by ranking pupils on the basis of reading achievement scores obtained on the Gates-MacGinitie tests and randomly assigning pupils in each block of 16 to one of the groups. This stratification was carried out to help make the 16 groups comparable in terms of total reading achievement. This helped to ensure that differences in performance on deleted and intact sentence structures were due, not to differing reading skills, but rather to the difference in syntactic structure.

Composition of the Treatment Groups

Since the groups were stratified on the basis of average reading scores, no attempt was made to equalize them on any other variable. As Tables I and II indicate, however, there were only slight variations among the groups in chronological age, vocabulary scores and comprehension scores. The groups did differ somewhat in terms of sex.

A one-way analysis of variance was conducted to determine the effectiveness of random stratification on the basis of average reading achievement scores. This analysis indicated that there was no significant difference between any of the groups at the first-grade (F=0.01, d.f.=15/144, n.s.) and second-grade (F=0.04, d.f.=15/144, n.s.) levels.

III. SELECTION AND ANALYSIS OF PRIMARY READING MATERIAL

Although there is a trend away from reading programs based exclusively on basal readers, these continue to be used extensively in most primary classrooms. Hence, two basal series were selected for

TABLE I

COMPOSITION OF EXPERIMENTAL GROUPS AT THE FIRST-GRADE LEVEL

Group	Chronological Age	Mean scores			Number	
		Vocabulary	Comprehension	Average Reading	Boys	Girls
1	80.7	54.7	53.2	54.1	4	6
2	82.1	54.7	53.5	54.5	5	5
3	82.0	55.4	52.5	54.2	5	5
4	81.9	52.7	54.5	54.0	6	4
5	82.7	55.2	53.7	54.8	4	6
6	80.4	53.9	54.8	54.7	4	6
7	81.4	56.5	51.6	54.3	4	6
8	80.9	54.6	53.4	54.3	4	6
9	82.5	53.6	54.0	54.0	5	5
10	81.9	54.0	53.9	54.3	5	5
11	82.5	54.6	53.0	54.1	6	4
12	83.0	55.7	52.0	54.0	6	4
13	80.9	56.3	52.4	54.7	3	7
14	82.1	56.4	52.1	54.4	6	4
15	82.5	53.6	53.7	53.8	7	3
16	81.0	54.1	54.4	54.4	6	4

TABLE II

COMPOSITION OF EXPERIMENTAL GROUPS AT THE SECOND-GRADE LEVEL

Group	Chronological Age	Mean scores Vocabulary	Compre- hension	Average Reading	Number Boys	Girls
1	95.4	59.2	52.7	56.2	4	6
2	92.6	57.6	51.6	54.8	5	5
3	93.7	58.5	51.0	55.1	5	5
4	95.8	56.2	51.8	54.3	5	5
5	92.2	57.1	51.5	54.5	4	6
6	91.9	57.7	51.5	54.9	5	5
7	93.5	58.7	51.6	55.3	4	6
8	93.8	58.1	50.2	54.4	6	4
9	96.2	57.8	51.2	54.8	4	6
10	93.7	58.7	50.8	55.0	4	6
11	93.5	57.8	50.4	54.4	7	3
12	94.4	58.1	51.4	55.0	3	7
13	93.5	57.7	52.2	55.3	4	6
14	96.4	58.1	51.6	55.1	6	4
15	93.8	59.6	50.4	55.2	5	5
16	94.2	57.1	52.3	54.9	7	3

analysis as well as several trade books. This section describes the materials selected for analysis and the method used in the final analysis of sentences from these materials.

It was necessary to carry out a random preliminary analysis of these primary reading materials to get frequency counts of various deletion transformation rules. After the final set of deletion transformations had been delineated for the study, a second, more complete analysis was conducted. The preliminary analysis is discussed in Chapter V.

Selection of Materials

The Ginn Basic Readers (Canadian Edition, 1957) have been widely used in Canadian classrooms for a considerable period of time and are still enjoying widespread use. This series employs a combination of methods, an eclectic approach, to the teaching of reading. At the primary level vocabulary is carefully controlled with systematic introduction and repetition of both vocabulary and concepts. The stories cover a broad range of interest (Manual for Teaching the First Reader, 1957).

The second basal series analysed, the Young Canada Readers (Nelson Language Development Reading Program) has been recently authorized by the Alberta Provincial Department of Education at the primary level. This series attempts to emphasize the relationship of reading to thinking and language development. A wide variety of stories, poems and plays in the readers are used to develop listening, speaking, reading, discussion and writing (Teacher's Guidebook for Funny Surprises, Kittens and Bears, and Pets and Puppets, 1970). This series was specifically chosen for analysis because the emphasis is on language development and one aspect of language is the thrust of this study.

Sentences were analysed from the preprimer through third reader levels of both the Ginn and Nelson series. These series were analysed for linguistic structures by Fagan (1969) at the fourth-grade level.

In addition to two basal series, the analysis of language structures included several trade books from the Beginner Books written by Dr. T.S. Geisel (Dr. Seuss). Dr. Geisel originated Beginner Books and is presently president and editor-in-chief. His books are highly aclaimed by educators (Chall, 1963) and are widely used as supplementary reading material for children in the primary grades. Books were selected at first, second and third reading levels as indicated in the Random House Catalogue for Teachers and Librarians (1973). An attempt was also made to analyse one of the Dr. Seuss Bright and Early Books to get a sample at the preprimer level, but this book contained phrases rather than sentences about pictures and could not be analysed.

Below is a complete list of the materials which were the source of sentence samples analysed in this study.

Series	Level	Name
Ginn Basic Readers (Canadian Edition, 1957)	Preprimer	My Little Red Story Book My Little Green Story Book My Little Blue Story Book
	Primer	The Little White House
	First Reader	On Cherry Street
	Beginning second	We Are Neighbours
	High second	Around the Corner
	Beginning third	Finding New Neighbours
	High third	Friends Far and Near

Young Canada Readers (1970)	Preprimer	Funny Surprises Kittens and Bears Pets and Puppets
	Primer	Mr. Whiskers
	First reader	The Toy Box
	Second reader	Magic and Make-believe
	Third reader	Treats and Treasures
Beginner Books	Primer (1.7)	Hop on Pop
	First reader (1.9)	Green Eggs and Ham
	Second reader (2.1)	The Cat in the Hat
	Third reader (3)	Horton Hears a Who

Analysis of Sentence Samples

All sentences in each of the preprimer, primer and first reader basal readers as well as those in all trade books were analysed because of the limited number and length of sentences in these books. From second reader through third reader basals, a sampling procedure was employed. The stories were selected from second- and third-grade books by dividing each reader into 10 sections so that each section contained approximately an equivalent number of pages. One story from each section was then selected using a table of random numbers. If a poem was randomly selected, the next story was taken instead. Titles were excluded from the analysis.

In this analysis of sentence samples, only those deletion transformations included in the final grammar (pp. 95 to 97) were tabulated. Each sentence was analysed and if a deletion transformation was involved in the production of that sentence, the page number on which it occurred was marked beside the appropriate transformation rule.

In each of the books analysed, one story was chosen for reanalysis and the results compared with those of the initial analysis. There was complete agreement between the two analyses.

IV. TESTING INSTRUMENTS

The following section will present an overview of test instruments used in this study.

The Standardized Reading Test

To obtain an estimate of each child's reading achievement, a standardized reading test was administered to all students in the test sample. Gates-MacGinitie Reading Tests (1965) were administered to pupils in both grades one and two, using Primary A, Form 1 at the first-grade level and Primary B, Form 1 with second-grade pupils.

The Gates-MacGinitie Reading Tests, Primary A level, is intended for use with grade one pupils and norms are provided for administration of this test in February or May. The Primary B level is designated for use in grade two with norms for October, February and May.

Both the Primary A and B levels consist of two parts, vocabulary and comprehension. The vocabulary test is intended to measure a child's ability to recognize or analyse isolated words. At both the Primary A and B levels, it consists of 48 items, each containing four words and a picture illustrating the meaning of one of the words. The child is instructed to circle the word which corresponds to the picture. The time allowed for this subtest is 15 minutes.

The comprehension test is designed to measure a child's ability to understand sentences and paragraphs. Both the Primary A and B forms contain 34 sentences and paragraphs of increasing difficulty and each passage is accompanied by four pictures. The child is instructed to mark the picture that corresponds with the meaning of the passage. The time allowance for this test is 25 minutes.

Norms were obtained for the Gates-MacGinitie Reading Tests by administering the tests to a nationwide sample in the United States of approximately 40,000 pupils in 38 communities. Tests were administered to first-grade pupils in January and April and to second graders in October and April.

Both alternate-forms and split-half reliability studies have been carried out with these tests. The alternate-forms reliability coefficients for the Primary A level are .86 on vocabulary and .83 on comprehension, and for Primary B, .87 on vocabulary and .81 on comprehension. Split-half reliability coefficients range from .91 to .94.

The Research Instruments

Research instruments were needed to measure word identification and comprehension of deleted and intact sentence structures, as well as recoverability of deleted words. The construction of these instruments is fully described in Chapter V and only a brief outline will be presented below.

Stories from the Ginn Basic Readers served as the source of test passages for this study. Eight passages were reconstructed from first and second reader levels with each passage containing test sentences for all 12 deletion transformations investigated in the study. Each passage contained six deletion produced structures and six intact sentences. The effect of deletion produced structures on word identification in context was assessed by having subjects read the test passages orally. Comprehension was measured by applying the cloze technique to all test passages. Recoverability was assessed through two formats. The first involved a multiple-choice test in which children were required to match intact and deleted sentences which were systematic paraphrases. The second was a modified cloze format with the children required to spontaneously 'recover' words affected by deletion transformations.

V. ADMINISTRATION OF THE INSTRUMENTS

Gates MacGinitie Reading Tests were administered to the second-grade sample during the third week in March, 1972 and to the first-grade sample during the last two weeks in April. All tests were administered by the investigator to pupils in groups of four to 25. The test was administered to each group in one sitting with a rest period between the vocabulary and comprehension tests.

All research instruments constructed for this study were administered to grade two pupils during the last two weeks of March and the first two weeks of April, 1972. Pupils at the first-grade level received these tests during the last week of April and the first three weeks of May.

All oral reading tests, including passages and word lists, were administered individually to pupils in both grades one and two. Word lists were administered prior to all other tests for first-grade pupils and prior to the first test administered individually at the second-grade level. The child was asked to read down the list of words; if he was unable to identify a word, he was asked to leave it and read the rest of the list. Pupils were asked to read passages assigned to them orally as the examiner recorded errors. If the child paused for more than five seconds without making an audible effort to pronounce the word or 10 seconds if he appeared to by trying to pronounce it, the word was supplied by the examiner. These are the time intervals used in the Gray Oral Reading Tests (1967). Complete directions for the oral reading tests are included in Appendix B.

The cloze tests constructed for this study were administered individually to first graders. Before beginning the first cloze test in the assigned set of tests, several sample cloze items were presented and the examiner worked through these with the child. Grade one pupils were allowed to either read passages orally and fill in blanks as they went, or read silently and indicate orally the appropriate word for each blank. If a child did not respond to a blank after 15 seconds, he was asked to leave it and proceed with the rest of the passage. A child was allowed to go back to change a response if he later decided he had made an error. No help with word recognition was given.

At the second-grade level, a written response to the cloze was required and this test was administered in small groups from three to 12. Again sample cloze items were presented before commencing with the first scheduled cloze test. Pupils worked through these orally with the examiner. During the cloze tests, pupils were given help with the spelling of words upon request, but no other assistance with word recognition was provided. Responses were constantly monitored and whenever a child wrote two words in one blank, the examiner asked the child to change this to only one word. Sample items and complete directions for the cloze tests are included in Appendix B.

Recoverability tests were administered individually at both grade levels. Again sample items were provided before beginning the actual test. The examiner read all cloze and multiple choice recoverability items to the children. On the cloze recoverability task, test sentences were read with a pause at the point where the child was to insert a word or words. He was told that the words inserted must result in a sentence which meant the same as the test sentence. If the child did not respond after 15 seconds, the examiner proceeded with the next item.

On the multiple choice test, the child was asked to identify the sentence that had the same meaning as the test sentence. Complete directions and sample items for both recoverability tests are included in Appendix B.

There was no time limit on any of the research instruments. The oral reading and recoverability tasks together took from 10 to 30 minutes to complete with each child. The five cloze tests took from 20 minutes to one and one-half hours.

All tests involving the grade two sample were administered by the investigator. Half of the individual testing at the first-grade level was administered by the investigator and the other half by a teacher certified, Bachelor of Education graduate. This examiner was trained by the investigator through provision of oral and written directions and an observation session. Results of the oral reading tests were tape recorded and these tapes were used by the investigator to note oral reading errors. Pupil responses to the cloze and recoverability tests were recorded by the trained examiner.

VI. SCORING OF THE INSTRUMENTS

All research instruments were scored by the investigator. The following section will describe the procedure employed in scoring the standardized reading, oral reading, cloze and recoverability tests.

The Standardized Reading Test

Gates-MacGinitie Reading Tests were marked according to answer keys provided and standard scores were obtained from the norms in the Teacher's Manuals. Since the second-grade sample had received the test during the third week in March, February norms were used in determining standard scores for them. At the first-grade level, May norms were used.

To obtain average reading scores for each pupil, standard scores obtained on the vocabulary and comprehension tests were averaged. This is a valid procedure since standard scores are based on an equal-interval scale.

Oral Reading and Cloze Tests

To obtain both quantitative and qualitative information about the effect of deletion produced structures on word identification and comprehension, tests were scored on three dimensions, number, location and type.

Number. On oral reading tests errors were marked as pupils read or from taped recordings of their reading. The error categories considered in this study included the following: aid (words pronounced by the examiner after five seconds if the child did not make any audible effort to pronounce the word, or 10 seconds if he appeared to be trying to pronounce it); non-meaningful mispronunciation; substitution of a meaningful word; omission of a word or group of words; inverting or changing word order; and insertion of a word or group of words not present in the text. These error categories are similar to those indicated in the Gray Oral Reading Tests (1967) although repetitions were not counted as errors in this study. Repetitions are frequently made by children on words they know in an effort to attack words further on in the text.

On the word lists, a word was counted correct if the child read it correctly or if he spontaneously corrected an error. Each child's oral reading errors were examined prior to tabulation of the data, and all those involving substitution, mispronunciation, omission or aid which had been read incorrectly by the child on the word list were marked. These errors were not included in the consideration of number and location of errors on deleted and intact sentences. This helped to ensure that differences in performance on deleted and intact structures were due to differences in syntactic structure rather than differences in word identification skills.

Following this the number of words in each sentence was counted and the proportion of errors was calculated for each sentence, first, for all words excluding those which could be affected by deletion transformations and, second, with inserted words taken into account.

Responses to the cloze tests were marked correct if they were exact replacements. Any other response or no response were considered incorrect. The proportion of exact replacements in relation to the total number of cloze items was tabulated, first, excluding inserted words and, then, including these words.

Type of Errors. Type of error was determined by classifying each error on a set of features similar to those used by Fagan (1969) to get an indication of how deletion transformations affect use of semantic and syntactic strategies by beginning readers. His study showed that it was necessary to consider the single item replaced and the item in context. Hence, the following four major features were established: grammatical in terms of the item deleted; grammatical in terms of context; semantic in terms of the item deleted; and semantic in terms of context.

An item was considered to be grammatical in terms of the item deleted when the expected response and the observed response were words belonging to the same grammatical category, as when a noun replaces another noun. Pronouns and nouns were treated as members of the same category for this analysis.

Grammatical in terms of context referred generally to syntactic coherence at the sentence level. Two basic types of information outlined by Chomsky (1965) were taken into consideration when deciding whether or not an observed response was grammatical in terms of context. The first involved selectional rules which analyse a symbol in terms of the syntactic features of the frames in which it can appear (restrictions of co-occurrence). These establish co-occurrence among nouns and verbs. The second, contextual features, analyse a symbol in terms of its categorial context. Features are assigned to symbols in terms of sister nodes dominated by the same category symbol, for example, a transitive verb would be marked __NP to indicate that it occurs in this environment. If a response violated selectional restrictions or was inconsistent with contextual features, it was marked negative with respect to the feature "grammatical in terms of context".

Semantic in terms of the item deleted referred to synonyms. This involved the traditional meaning of synonym in which the observed response had the same or nearly the same meaning as the expected response.

Semantic in terms of context involved semantic acceptability and this was considered at both the sentence and passage levels. A response was marked acceptable in relation to the passage if it resulted in a sentence consistent with the overall meaning of the passage. The response was marked semantic at the sentence level if it resulted in a meaningful sentence.

Substitutions of proper names for other proper names were not marked as synonyms as in Fagan's study, but were considered in terms of sentence and passage meaning.

Several errors involved a morphological change, for example, singular nouns were substituted for plural nouns or past tense verbs for present tense verbs. In these cases, the lexical stem or root word was retained. These were marked in terms of grammatical and semantic features and also noted as morphological variants.

The final set of features used when considering type of error included:

1. grammatical features
   - G_1 - grammatical in terms of the item
   - G_2 - grammatical in terms of context
2. semantic features
   - S_1 - synonym
   - S_2 - semantically acceptable at the passage level
   - S_3 - semantically acceptable at the sentence level

There is considerable redundancy among the categories outlined above, particularly those which are semantic. All synonyms are consistent with sentence and passage meaning. All observed responses consistent with passage meaning are redundantly consistent with meaning at the sentence level. If a response is not consistent with sentence meaning, it cannot be a synonym or meaningful in terms of the passage. In addition, if a response is not consistent with the meaning of the passage, it cannot be a synonym. These semantic redundancies are summarized below.

$$+S_1 \longrightarrow +S_2, +S_3$$

$$+S_2 \longrightarrow +S_3$$

$$-S_2 \longrightarrow -S_1$$

$$-S_3 \longrightarrow -S_2, -S_1$$

There is no redundancy between the two grammatical categories but there is one further redundancy across the semantic and grammatical categories. All errors which are grammatically unacceptable in terms of context are redundantly not semantically acceptable in terms of the item or context ($-G_2 \rightarrow -S_1, -S_2, -S_3$). This results from both theoretical and practical considerations. The theory of meaning adopted in this study maintains that meaning beyond the word level involves syntactic and pragmatic factors as well as the meaning potentialities of the words. Syntax is seen as an important aspect of meaning and hence, a sentence must be grammatical to be meaningful. From a practical point of view, if non-grammatical sentences were allowed to be semantically acceptable, criteria for semantic acceptability would become very difficult to establish.

After redundancies among features were considered, the following categories were established for consideration of type of error on both the oral reading and cloze tests.

$+G_1$ - grammatical in terms of the item

$+G_2$ - grammatical in terms of context

$+G_1+G_2$ - grammatical in terms of the item and context

$+S_1$ - semantic in terms of the item (synonym)

$+S_2$ - semantically acceptable at the passage level

$+S_3$ - semantically acceptable at the sentence level

$+G_2+S_2$ - grammatically and semantically acceptable in context

$-G-S$ - marked negatively on all features

On the oral reading tests, all substitution errors were analysed and placed in one of the categories outlined. Additions, omissions and transpositions were marked in terms of grammatical coherence (G_2) and also in terms of sentence and passage meaning. Mispronunciations and words pronounced by the examiner could not be analysed in terms of the categories. All errors except those involving aid were marked to indicate whether or not they were corrected spontaneously by the child.

Excluding omissions, all errors on the cloze tests were scored in terms of the categories indicated above. Omissions were noted and the proportion of omissions was included as a variable in analysis of the data.

One type of error which was of particular interest involved insertion of deleted words in the oral production of sentences containing deletion produced structures. This type of error has been noted by both Allen (1969) and Beaver (1968). Interestingly, there were also several instances of omission of elements which had been inserted and these were noted as well. Although the cloze test restricted the child in the number of words which could be inserted, several responses suggested omission or insertion of elements affected by deletion transformations.

Location of Oral Reading Errors and Exact Cloze Replacements. Location of words was categorized within each sentence on the following dimensions: preceding the point at which the deletion transformation applied; following the point at which the deletion transformation applied; occurring in the embedded or conjoined string to which the deletion transformation applied; and occurring in the matrix sentence. The last two dimensions could apply only to sentences involving more than one string and hence, could not apply to sentences such as those involving the performative deletion transformation.

All errors on the oral reading tests, except those incorrectly read on the word lists, were analysed in terms of the location categories. On the cloze tests, exact replacements rather than errors were placed in the location categories.

Recoverability Tests

Scoring the multiple choice recoverability test was very straight forward with each item marked correct or incorrect.

Responses on the cloze recoverability task were marked three ways: incorrect, full recoverability and truncated recoverability. Full recoverability referred to exact replacement of deleted lexical items, as well as replacement of deleted items by a coreferential form such as a noun for a pronoun. Truncated recoverability referred to recovery of some of the deleted words so that this recovery resulted in a paraphrase of the sentence containing elements which could be deleted. For example, in the item *it went up over the trees and the houses*, the response *it went up over the trees and it went up over the houses* involves full recoverability. The response *it went up over the trees and went up over the houses* involves truncated recoverability.

VII. ANALYSIS OF THE DATA

Two steps were necessary in analysis of the data. The first involved generation of criterion variables and the second, statistical treatment of the data. Services were obtained from the Division of Educational Research and the Computing Center at the University of Alberta.

Generation of Variables

After all items on the oral reading and cloze tests had been scored in terms of number, type and location, scores were combined for words in each test sentence. For each subject, these combined raw scores for each sentence were then read into the computer and stored on magnetic tape to facilitate handling. On the cloze tests each pupil had scores for sentences on both the intact and deleted forms for each deletion transformation rule investigated. Scores were obtained for either the intact or deleted form for each transformation rule on the oral reading tests.

A computer program was written to combine data for each pupil on each form (intact or deleted) for each transformation rule, and to convert this combined data to proportion scores. It was necessary to make this conversion because of differing numbers of words in test sentences. There were, however, several instances in which subjects did not answer any cloze items correctly or did not make any oral reading errors. Since zero divided by zero is not mathematically equal to zero, this would normally be considered as missing data. To prevent the differential elimination of data from this source, the proportion operation was considered as an optional transformation. It was applied only when the denominator was greater than zero. Otherwise it did not apply and raw data were used.

These generated criterion variables were used in all statistical treatment of the data for the number, type and location categories on the oral reading and cloze tests.

Statistical Analysis of the Data

Two types of t-test programs were run at each grade level to test for differences in performance on deletion produced structures and those in which words affected by deletion transformation were left intact. The first involved correlated t-tests for the significance of differences between mean cloze scores of pupils on deleted and intact sentence structures for 16 variables involving number, type and location. On oral reading tests, groups with scores on the deleted sentence structures and those with scores on intact sentence structures were mutually exclusive, and independent t-tests were run to test significance of differences on 19 variables involving number, type and location between intact and deleted forms.

Correlations were computed to determine the validity of cloze scores at the first- and second-grade levels, and to determine the relationships among the variables sex, chronological age, reading achievement, recoverability scores and proportions of exact replacements and oral reading errors obtained on deleted and intact sentence structures. All cloze, oral reading and recoverability scores were standardized prior to computation of these correlations.

In order to assess similarity of means of the experimental groups at each grade level on total reading achievement, a one-way analysis of variance program was employed.

VIII. SUMMARY

The population for this study involved grades one and two pupils from seven elementary schools in a suburban area. At each grade level, 160 pupils were randomly selected from this population to form the test sample. Each grade sample was then randomly stratified into 16 groups on the basis of reading achievement scores.

The research study was conducted in two stages with simultaneous analysis of primary reading material and delineation of deletion transformations first, and collection and analysis of data second. Two basal reading series as well as a number of trade books were selected for linguistic analysis. In addition to a standardized reading test, oral reading, cloze and recoverability tests specifically constructed for this study were administered. Since there were 16 forms of each test passage at each grade level, a counterbalanced research design was used in collection of the data. Oral reading and cloze tests were scored on three dimensions, number, type and location, to obtain both quantitative and qualitative information about the effect of deletion produced structures on word identification and comprehension.

Data were combined and converted to proportion scores prior to statistical treatment. T-tests, computations of correlation and one-way analysis of variance were then applied to the data.

CHAPTER V

DELINEATION OF DELETION TRANSFORMATIONS AND CONSTRUCTION OF THE RESEARCH INSTRUMENT

The first stage of this study involved simultaneous analysis of primary reading material and formulation of the set of deletion transformation rules to be investigated. The following section will describe the grammar which served as the starting point for the delineation of transformation rules, and the revision of this list of deletion transformation rules on the basis of both preliminary analysis of basals and practical problems related to the research instrument. It will also describe the construction of the research instruments used in this study.

I. DELINEATION OF DELETION TRANSFORMATION RULES

The revision of the Bateman-Zidonis grammar carried out by Fagan (1969) was used as the starting point in delineating deletion transformation rules to be considered in this study. Fagan included the following seven deletion transformations:

Common Elements Deletion (from conjoining): Example - His room seemed lonely and damp.

WH Deletion: Example - He has a book he wants to show you.

WH + BE Deletion: Example - The boy starting at quarterback is in my class.

(That) + S as Object: Example - I know he is a diligent student.

(That) + S as Object (quotation): Example - She told Ruth and Mona, "Your little sister got a bad cut."

Comparative Deletion: Example - This book is more interesting than that one.

Adverbial Replacement Deletion: Example - After that he walked around the room and poked his nose into everything.

Preliminary Revision Based on Theoretical and Practical Considerations

All of the deletion produced structures included by Fagan (1969) involve more than one underlying string. Some of the structures which he categorized as produced by Simple transformations because they apply to a single string also appear to involve a deletion operation in their derivation. Formation of the imperative, for example, is generally considered to involve deletion of the noun phrase you (Chomsky, 1965, p. 144; Jacobs and Rosenbaum, 1968, p. 32-33) or the noun phrase you plus the auxiliary will (Burt, 1971, p. 12). A second transformation which Fagan classified as Simple involves formation of the passive truncate. Several linguists including Burt (1971, p. 54) have suggested that the passive truncate is formed by an optional 'agent deletion' transformation when the agent is the indefinite pronoun someone or something. For example, the sentence the spirit was felt is considered to be derived from the spirit was felt by someone. Watt (1971) has pointed out some difficulty with this interpretation, but both the passive truncate and the imperative were included in the set of possible deletion transformations to be investigated in this study.

One problem which is specific to this study and which helped to reduce the number of deletion transformations included to a subset of all structures produced by deletion operations involves obligatory vs. optional transformations. All of the deletion transformations listed by Fagan except "(That) + S as Object (quotation)" are optional and as such need not apply when their structural description is met. A sentence meeting the structural description of an obligatory transformation such as "(That) + S as Object (quotation)" is not grammatical unless the deletion transformation applies. It is impossible, therefore, to rewrite a sentence produced by this transformation rule with words affected by deletion transformation left intact and retain a grammatical sentence. Hence, this transformation and all other obligatory deletion transformations were eliminated from the study. The comparative is somewhat complex in this regard. Deletion must apply to some words in the second string but may or may not apply to other words. As Chomsky points out in Aspects of the Theory of Syntax (1965, pp. 178-180), the comparative transformation is an erasure operation that uses the adjective of the matrix sentence to delete the corresponding adjective of the embedded sentence. This would result in such derived sentences as John is more clever than Bill is. A final option would be to delete the repeated copula or in other comparatives, the repeated verb. Since the derivation of a comparative involves optional deletion of some words, an optional "comparative deletion" transformation rule was included in the study.

A second problem which further reduced the subset of deletion transformations to be considered for this study involves the nature of such structures as genitives, adjectives, gerundives and compounds. Expansion of sentences containing these structures through insertion of elements affected by deletion frequently results in long, awkward sentences as in the expansion of the phrase the little toy tractors. These sentences would be much longer than those normally found in primary reading materials and no doubt the length factor would confound the effect of the syntactic variable being studied. This problem appears to be partially related to the fact that deleted and intact forms of genitives, adjectives and other similar structures differ by the application of more than the deletion operation. These structures also involve a shift in position. Deleted and intact sentence structures included in this study almost invariably differ by the application of one deletion transformation rule, and structures such as adjectives and genitives were eliminated from consideration. The exceptions to this are the common elements deletions involving the noun phrase where pronominalization normally applies to a coreferential noun phrase in a conjoined sentence (Chomsky, 1965). This would result in the intact and deleted structures differing by a change in words as well as deletion. It also raises the problem of possible ambiguity of the pronoun and the effect this would have on the way children would respond to the intact pronominalized form. Hence, a short anaphoric reference test was included in the pilot study. Prior to any analysis of primary reading material, the subset of possible deletion transformations which could be included in the study had already been greatly reduced to that which follows:

Common Elements Deletion
WH Deletion
WH + BE Deletion
Comparative Deletion
Adverbial Replacement Deletion
(That) + S as Object
Imperative Deletion
Passive Truncate

Final Revision Based on Analysis of Basal Reading Material

The two basal reading series selected for linguistic analysis in this study were the Ginn Basic Readers (Revised Canadian Edition, 1957) and the Young Canada Readers (Nelson Language Development Reading Program, 1970 Edition), preprimer through third reader levels. The selection and analysis of these series are described in Chapter IV.

A preliminary analysis of these basals was carried out to make any additions or omissions necessary to the above set of rules to account for all deletion produced structures in these materials within the limitations outlined. Each sentence in the preprimer and primer levels and sentences from stories selected randomly in the first reader through third reader levels were analysed. If the sentence involved a deletion in its production, a search was made of the rules formulated above to determine if one of the rules would account for the structure. When several instances of a rule were found, the transformation was retained. When instances were not found for a particular rule, or the sentence structure was extremely rare, it was omitted. All structures which appeared to be produced by deletion but were not accounted for by rules in the preliminary revision were noted for further consideration. These were considered jointly by the investigator and Dr. G. Prideaux from the Department of Linguistics, University of Alberta, to arrive at the final set of transformation rules for the study.

Two of the deletion transformations were eliminated because they occurred very infrequently at all reader levels, the "adverbial replacement deletion" and the "passive truncate".

Several sentence structures which involved a deletion operation in their production were unaccounted for and the following deletion transformations were added: "preposition (infinitive) deletion", "performative deletion", and "BE deletion". The "preposition deletion" was needed to account for such sentences as I can help you make a cake. Sentences such as Zoom! Zoom! and On down a hill occurred in all reader levels analysed and the "performative deletion" was formulated to account for these. It was postulated that the intact forms of these sentences were Zoom! Zoom! went the airplane and On down a hill went the pancake. The "BE (existence) deletion" accounts for sentences of the type Nothing but bread in the wagon and A big, big hill in which the intact structures are assumed to be Nothing but bread is in the wagon and This is a big, big hill respectively. These latter two structures were conflated for theoretical and practical reasons. Both appeared to involve deletion of words with essentially the same meaning (existence) and there were too few of either to formulate separate rules.

A small number of other structures involving pro-forms such as I am going to Grandmother's were not accounted for by the formulated rules but occurred so infrequently that they were not further considered.

Common elements deletions occurred very frequently and hence, this category was expanded to the following four types: "verb phrase deletion", "noun phrase deletion", "noun phrase + auxiliary (verb) deletion", and "noun phrase + verb + other elements in the verb phrase deletion". Some common elements deletions operated across sentence boundaries but these did not occur with sufficient frequency to form a separate category and all could be included in the other categories.

The final set of deletion transformation rules included in the study follows:

1. WH Deletion[1]

$$\begin{array}{llllll} \text{SD:} & \text{NP} & [_S\ [_{NP} & \text{wh X}\ ] & \text{Y}\ ]_S & \\ \text{SC:} & 1 & 2 & & 3 \rightarrow & \\ & 1 & \emptyset & & 3 & \end{array}$$

Example - Here are the very best shoes you can buy.

2. BE Deletion

$$\begin{array}{llll} \text{SD:} & \text{NP} & \text{be}\frown\text{T} & \text{PP} \\ \text{SC:} & 1 & 2 & 3 \rightarrow \\ & 1 & \emptyset & 3 \end{array}$$

Example - Nothing but bread in the wagon.

$$\begin{array}{llll} \text{SD:} & \text{NP}_1 & \text{be}\frown\text{T} & \left\{\begin{matrix}\text{NP}_2 \\ \text{PP}\end{matrix}\right\} \\ \text{SC:} & 1 & 2 & 3 \rightarrow \\ & \emptyset & \emptyset & 3 \end{array}$$

Example - A big, big hill.

3. WH + BE Deletion

$$\begin{array}{llllll} \text{SD:} & \text{NP} & [_S\ [_{NP}\ \text{wh X}] & [\text{be}\frown\text{T}] & \text{Y}\ ]_S \\ \text{SC:} & 1 & 2 & 3 & 4 \rightarrow \\ & 1 & \emptyset & \emptyset & 4 \end{array}$$

Example - Here is a big bear funny and brown.

4. (That) + S as Object

$$\begin{array}{llll} \text{SD:} & \text{V}\ [_S & \text{that} & \text{X}\ ]_S \\ \text{SC:} & 1 & 2 & 3 \rightarrow \\ & 1 & \emptyset & 3 \end{array}$$

Example - They think I am too little.

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[1] This rule can be conflated with that for WH + BE deletion but since they were treated separately in this study, they are presented as separate rules here.

5. Performative Deletion[1]

$$\begin{array}{lccc} \text{SD:} & NP & \begin{bmatrix} V \\ +perf \end{bmatrix} & Y \\ \text{SC:} & 1 & 2 & 3 \longrightarrow \\ & 0 & 0 & 3 \end{array}$$

Example - Zoom! Zoom!
On down a hill.

6. Imperative Deletion

$$\begin{array}{lcccc} \text{SD:} & you & Pres & M & X \\ \text{SC:} & 1 & 2 & 3 & 4 \longrightarrow \\ & 0 & 2 & 0 & 4 \end{array}$$

Example - Look in this bag.

7. Preposition Deletion (infinitival complement)[2]

$$\begin{array}{lcccc} \text{SD:} & V_h & NP & to & V \\ \text{SC:} & 1 & 2 & 3 & 4 \longrightarrow \\ & 1 & 2 & 0 & 4 \end{array}$$

Condition: $V_h = help$

Example - I can help you make a cake.

8. Common Elements Deletion (verb phrase deletion)

$$\begin{array}{lccccc} \text{SD:} & [_S\ NP\ \ X & VP\ ]_S & C_{coor} & [_S\ NP\ \ Y & VP\ ]_S \\ \text{SC:} & 1 & 2 & 3 & 4 & 5 \longrightarrow \\ & 1^\frown 3^\frown 4 & 2 & 0 & 0 & 0 \end{array}$$

Condition: $2 = 5$

Example - Flip and Pony went fast.

---

[1] This rule is somewhat difficult to formalize. When NP is human the V is generally a form of say; when NP is inanimate, the V is generally a form of go.

[2] This rule appears to be ad hoc since the only verb to which it applies is help. It may eventually be formalized as part of a more generalized rule involving the auxiliary.

9. Common Elements Deletion (noun phrase deletion)

$$\begin{array}{llllllllll} \text{SD:} & [_S & \text{NP} & \text{X} & \text{VP}\ ]_S & \text{C}_{\text{coor}} & [_S & \text{NP} & \text{Y} & \text{VP}\ ]_S \\ \text{SC:} & & 1 & & 2 & 3 & & 4 & & 5 \rightarrow \\ & & 1 & & 2 \frown 3 \frown 5 & \emptyset & & \emptyset & & \emptyset \end{array}$$

Condition: 1 = 4

Example - Mr. Green saw the girls and came to the door.

10. Common Elements Deletion (noun phrase + auxiliary (verb) deletion)

$$\begin{array}{llllllllllll} \text{SD:} & [_S & \text{NP} & \text{Aux} & \text{V} & \text{X}\ ]_S & \text{C}_{\text{coor}} & [_S & \text{NP} & \text{Aux} & \text{V} & \text{Y}\ ]_S \\ \text{SC:} & & 1 & 2 & 3 & 4 & 5 & & 6 & 7 & 8 & 9 \rightarrow \\ & & 1 & 2 & 3 & 4 \frown 5 \frown (8) \frown 9 & \emptyset & & \emptyset & \emptyset & \emptyset & \emptyset \end{array}$$

Condition: 2 = 7; 3 = 8

Example - The fly sat on his nose and then on his ear.

11. Common Elements Deletion (noun phrase + verb + other elements in the verb phrase deletion)

$$\begin{array}{llllllllllllll} \text{SD:} & [_S & \text{NP} & \text{Aux} & [_{VP}\ \text{V} & \text{X} & \text{Y}\ ]_{VP}\ ]_S & \text{C}_{\text{coor}} & [_S\ \text{NP} & \text{Aux} & [_{VP}\ \text{V} & \text{X} & \text{Z}\ ]_{VP}\ ]_S \\ \text{SC:} & & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \rightarrow \\ & & 1 & 2 & 3 & 4 & 5 \frown 6 \frown 11 & \emptyset & \emptyset & \emptyset & \emptyset & \emptyset & \emptyset \end{array}$$

Condition: 2 = 8; 3 = 9; 4 = 10

Example: A black bear came to the pond to drink and to catch fish.

12. Comparative Deletion

$$\begin{array}{llllllll} \text{SD:} & \text{Aux} + \text{V} & \begin{bmatrix} \text{as} \\ \text{more} \end{bmatrix} & \text{Adj} & \text{Y} & \begin{bmatrix} \text{as} \\ \text{more} \end{bmatrix} & \text{Z} & \text{Aux} + \text{V} \\ \text{SC:} & 1 & 2 & 3 & & 4 & 5 & 6 \rightarrow \\ & 1 & 2 & 3 & & 4 & 5 & \emptyset \end{array}$$

Condition: 1 = 7

Example - Before long he could read as well as anyone in the woods.

II. CONSTRUCTION OF THE RESEARCH INSTRUMENT

Research instruments were needed to measure word identification and comprehension of sentences with intact and deleted structures, as well as recoverability of deleted words. Prior to actual construction of these instruments, a pilot study was necessary to help determine validity, reliability and/or feasibility of the proposed format for the instruments. The following section will describe the pilot study, selection of the test passages and construction of the oral reading, cloze and recoverability tests.

Pilot Study

A pilot study was conducted during the period from January 24 to February 4, 1972 in a primary school in a small Alberta town. Thirty first graders and twenty second graders were involved in this pilot project. The major purpose was to investigate the validity and reliability of an oral response to the cloze test at the first-grade level. As indicated earlier (p. 41), studies have questioned the reliability and validity of both a standard cloze and multiple choice version at this grade level. In addition, the pilot study was conducted to investigate two techniques for assessing recoverability of words affected by deletion transformations, and to investigate difficulties surrounding anaphoric reference in the common elements deletion of the noun phrase. The pilot study also suggested desirable refinements in the administration of the instruments.

Oral Response to the Cloze. In order to assess validity and reliability of an oral response to the cloze, one story was selected from the Primer level of Ginn Basic Readers and every fifth word was deleted. The test contained 51 blanks which Taylor (1956) has suggested to be an adequate number to ensure a representative sample of items.

This test was typed on a primary typewriter and administered individually to 30 pupils. It soon became evident that some pupils found it much easier to perform the task if they read the text silently and then supplied the correct word; others clearly preferred reading orally and filling in the blanks as they read. Hence, it was decided to offer the pupils a choice to read either silently or orally during administration of the cloze tests.

Following administration of the individual cloze test, the comprehension subtest of the Gates-MacGinitie Reading Tests, Primary A, Form I, was administered to the 30 pupils in one group. Standard scores were determined using norms presented in the Teacher's Manual for the Gates-MacGinitie tests. To obtain an estimate of the validity of the cloze test as a measure of reading comprehension, these standard scores and the raw scores from the cloze test were subjected to a computer program processed by the Computing Center at the University of Alberta. A correlation coefficient of 0.526 was obtained between these scores, significant at the .003 level of confidence. This was considered to be a minimal estimate of the relationship between the cloze and Gates-MacGinitie comprehension scores because of the following factors. The first involves the relative homogeneity of the first-grade classroom assigned for the pilot project. Standard scores ranged from 47 to 73 but most of the scores clustered in the 56 to 60 interval. Secondly, the relative ease of word recognition on the cloze test sharply contrasted with difficult vocabulary on the Gates-MacGinitie test. The factor of word recognition played almost no part in the scores obtained on the cloze but was of considerable importance in scores on the Gates-MacGinitie comprehension subtest. Hence, although this coefficient of correlation was somewhat lower than anticipated, it was felt when all factors were considered, that the cloze had adequate validity for the major study.

In order to obtain an estimate of internal-consistency reliability, a split-half test was undertaken. For each subject two scores were obtained, one based on his item scores for odd-numbered items and the other based on his item scores for even-numbered items. Computer results showed that the overall reliability (internal consistency) of the oral response to the cloze was 0.69.

Recoverability Tasks. Two techniques to assess recoverability of words affected by deletion transformations were evaluated in the pilot study. The first was a modified cloze test. Twelve sentences were presented with a blank replacing words affected by one of the deletion transformations included in the study. The children were asked to indicate what word or words could fit in the blank so the resulting sentence would mean the same as the sentence without any words inserted. Sentences were taken from the Primer level of the Ginn Basic Readers for grade one pupils and from the Ginn second reader, level one, for second graders. This test was administered individually to 30 first graders and 20 pupils in grade two. All sentences were read by the examiner with a pause at the point where words were to be inserted.

Pupils at both grade levels, particularly in grade one, had considerable difficulty with this task. Two factors appeared to be involved in this difficulty in addition to inability to recover underlying words. First, the number of words to be inserted was variable.

But of much greater importance appeared to be the fact that the sentences were semantically and grammatically acceptable without any insertion in the blank. Responses to each blank were marked as incorrect, full recoverability, or truncated recoverability. Full recoverability was accorded a response in which all of the words deleted by the transformation rule were recovered exactly. Truncated recoverability referred to responses in which only part of the words were recovered and these resulted in a sentence which meant the same as the test sentence. The following figure shows the distribution of scores obtained on this test.

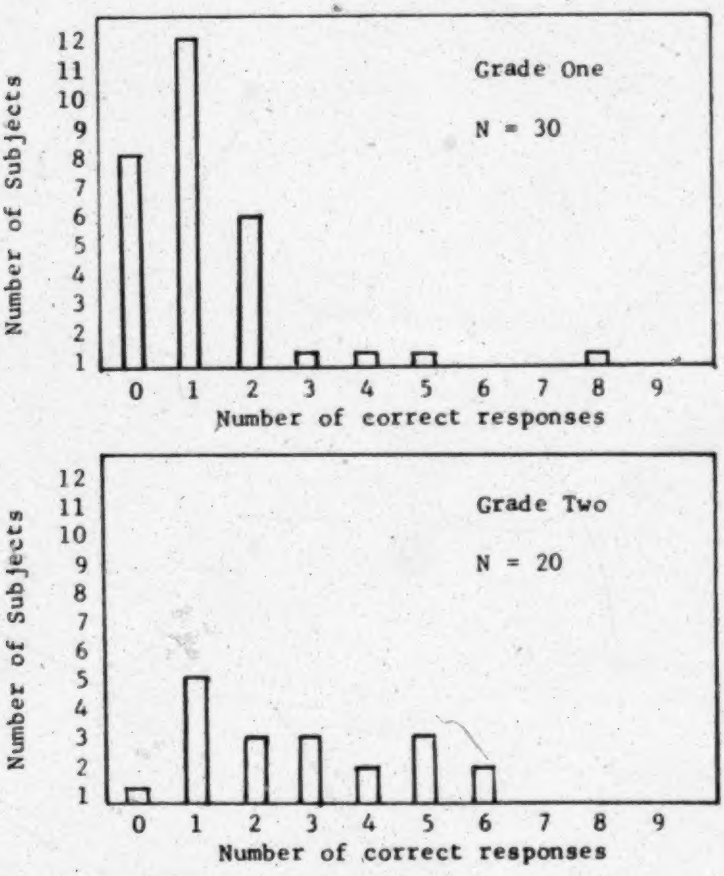

FIGURE 3

RESULTS ON THE CLOZE RECOVERABILITY TASK

Even though the results were very skewed and each pupil recovered few items, each deletion transformation involved in the study was recovered by at least one pupil. The strength of this test was that the structures tested were left in context and it assessed spontaneous recoverability. It also provided an opportunity to qualitatively consider children's attempts to recover deleted words.

The second recoverability task was constructed with a multiple choice format. In each item the stimulus sentence contained a deletion produced structure and the child was to choose from three other sentences the one which meant exactly the same as the stimulus sentence. The correct sentence was the one in which the elements which could have been deleted were left intact. One of the distractors involved the change of one lexical item in the stimulus sentence. In the second distractor, the deleted words were incorrectly replaced. An example of one item involving the "(that) + S as object" deletion transformation follows.

I know you will like this toy.

I know where you will like this toy.

I know that you will like this toy.

I know you will like this kitten.

The results of this test were also skewed especially at the second-grade level, but in the opposite direction to those obtained on the cloze recoverability task as shown in Figure 4.

The pilot study clearly revealed that the tests were not measuring exactly the same thing, but both appeared to be providing information about recoverability. Hence, both were retained in the major study.

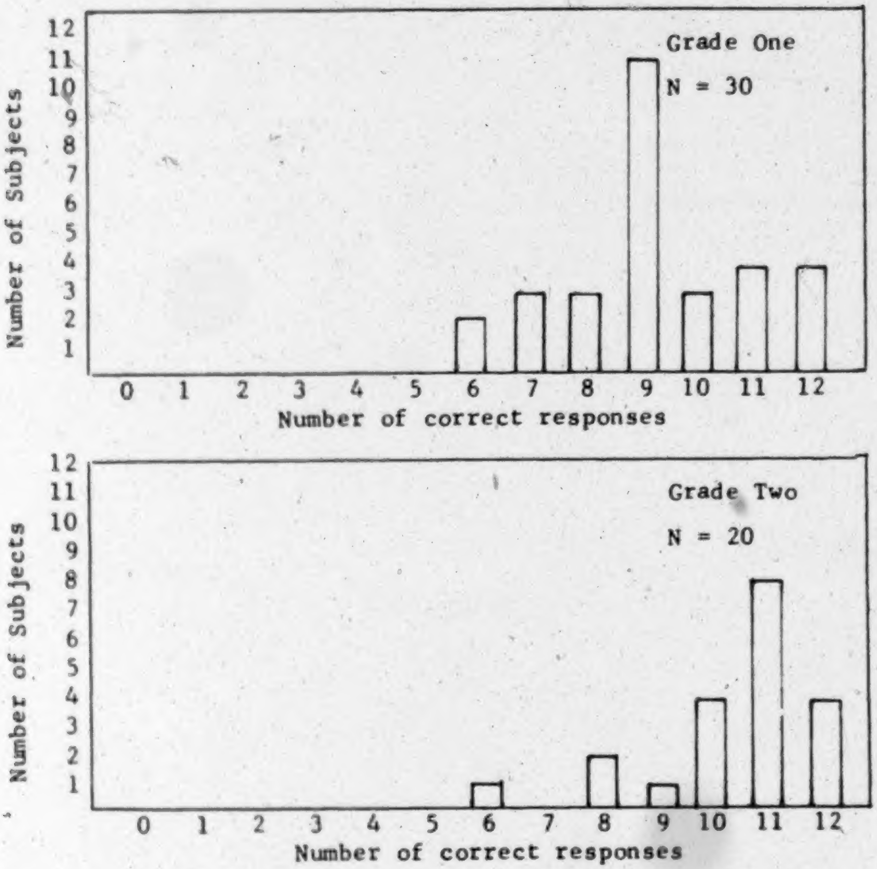

FIGURE 4

RESULTS ON THE MULTIPLE CHOICE RECOVERABILITY TASK

Anaphoric Reference. A final aim of the pilot study was to investigate the effect of anaphoric reference involved in the common elements deletion of the noun phrase. As indicated in the discussion of deletion transformations selected for this study (pp. 91-92), an attempt was made to restrict the study to those which result in deleted and intact structures differing by the application of only one rule, that involving a deletion operation. However, when elements deleted include the noun phrase, a problem arises. For example, if common elements deletion does not apply to the children looked at little trucks and they looked at little toy tractors. The problem which this creates involves possible ambiguity of the pronoun since very little is known about children's understanding of anaphoric reference. Six sentences were selected from the Ginn Basic Readers at each of the Primer and Second Reader levels. The children were asked to indicate the referent for the pronoun. For example, they were asked to indicate who he referred to in the sentence Tom saw Betty and he saw Susan. First graders responded correctly to this task 73 per cent of the time and second graders 93 per cent of the time. On the basis of these results, a decision was made to apply pronominalization to sentences used for second-grade pupils but to leave both noun phrases intact for the first-grade sample. Some examples with the second noun phrase intact had been included in the pilot study (for example, airplanes come and airplanes go here), and these were not considered unusual by grade one pupils. In fact this type of sentence structure occurs fairly frequently in first-grade basal readers.

Test Passages

Test passages were selected from the Ginn Basic Readers, First Reader level and Second Reader, Level Two. At each grade level, eight stories were chosen on the basis of the analysis carried out earlier with an attempt to choose stories which contained as many of the selected test structures as possible, either in deleted or intact form. At the second-grade level, since testing occurred during March and the first two weeks of April, the majority of stories were selected from the first half of the book. Stories selected were those beginning on pages 13, 31, 49, 64, 89, 110, 177 and 200. At the first reader level testing occurred during the last week in April and first three weeks of May and stories were selected equally from all sections of the book, with four from the first half and four from the second half. Stories selected were those beginning on pages 29, 66, 73, 97, 137, 161, 167 and 199.

All passages had to be reconstructed so that each contained all deletion transformations included in the study, with half of these presented as deletion produced structures and the other half left intact. Reconstruction involved changing, removing and adding sentences to existing passages.

At the second-grade level, passages were approximately 200 words in length; those at the first-grade level were approximately 150 words long.

Two versions of each passage were constructed. In the first version, half of the test sentences (first, third, fifth etc.) were presented as deletion produced structures, and the other half (second, fourth, sixth etc.) were presented with words which could be deleted left intact. The second version of each passage was the mirror image of version one with test sentences two, four, six etc. presented with words deleted, and the other sentences, one, three, five etc. presented as intact sentence structures. Appendix A contains both versions of all passages at each grade level included in this study.

Oral Reading Tests

The two versions of each passage as outlined above were presented to children for oral reading to obtain information regarding the effect of deletion produced structures on word identification in context. The first-grade selections were typed on a primary typewriter and those at the second-grade level with pica type.

Random stratification of the sample into groups on the basis of reading achievement ensured to some extent that differences in performance on deleted and intact structures were not due to differing reading skills, but rather to differences in syntactic structure. However, to further ensure this, tests to measure word identification in isolation were also constructed. A word list was compiled for each test passage containing all of the words which occurred in that passage. Each child was required to read the list of words corresponding to the test passage to be read orally. Oral reading errors on the test passages were examined prior to tabulation of the data, and those involving words incorrectly read on the word list were identified.

Cloze Tests

To get an indication of the effect of deletion produced structures on comprehension, the cloze technique was used with the two versions of each test passage. Five forms of each version were constructed so that every word was ultimately deleted. Each child completed five cloze tests, and hence, answered approximately 100 cloze items. This is adequate in terms of Taylor's suggestion that a 50 item test provides a sufficient sample to present items covering the full range of difficulty.

All first-grade cloze passages were presented in primary type and those at the second-grade level in pica type.

Recoverability Tests

As indicated previously in discussion of the pilot study, two techniques for measuring recoverability were retained in the major study, the first a modified cloze test and the second a multiple choice test.

In the modified cloze format, each passage was presented with a blank at the point where words had been deleted in sentences containing deletion produced structures. Since each version contained six sentences with deletion produced structures, each child was presented with six items of this type.

The multiple choice test required that test sentences be taken out of context, although in several instances the preceding sentence was presented in the test item along with the test sentence. For each passage every sentence containing a deletion produced structure was isolated and a multiple choice item constructed. These were constructed exactly as described in discussion of the pilot study. The stimulus sentence in each item contained a deletion produced structure and the child was to choose from three other sentences the one which meant the same as the stimulus sentence. The correct sentence was the one in which the words affected by the deletion transformation were left intact. The first distractor involved a change in one of the lexical items, and the second, insertion of meaningful but incorrect words. An attempt was made to insert words in the same syntactic category as those deleted. Again each child completed six of these items.

Summary of Research Tests

Considering the oral reading, comprehension and recoverability tests together, there were sixteen forms of each of the eight test passages at each reader level as indicated below.

Version I	Version II
Oral reading	Oral reading
Cloze one	Cloze one
Cloze two	Cloze two
Cloze three	Cloze three
Cloze four	Cloze four
Cloze five	Cloze five
Cloze recoverability	Cloze recoverability
Multiple choice recoverability	Multiple choice recoverability

III. SUMMARY

Fagan's (1969) grammar served as the starting point in delineation of deletion transformation rules to be investigated in this study. Some rules were omitted from his list because their occurrence was very infrequent in primary reading materials and others because of the nature of the research instrument employed in this study. Two rules classified by Fagan as Simple transformations were added because linguists generally consider them to involve a deletion operation. Other rules were added to account for deletion produced structures present in primary reading materials that were not included in Fagan's grammar.

Research instruments were constructed to measure word identification and comprehension of intact and deleted sentence structures and also recoverability of deleted words. A pilot study helped to establish validity and reliability for an oral response to the cloze test at a grade one level, and also investigated children's understanding of anaphoric reference and two methods for assessing recoverability. Eight test passages were reconstructed from stories in the Ginn Basic Readers so that each passage contained test sentences for all deletion transformations, half in deleted form and the other half intact. Word identification was assessed by having children read these test passages orally. The cloze technique was applied to all passages to measure comprehension. Recoverability was assessed by tests involving multiple choice and cloze formats. When both versions of all oral reading, cloze and recoverability tests were combined, there were 16 tests for each of the eight passages at each grade level.

CHAPTER VI

FINDINGS: ANALYSIS OF SENTENCES FROM PRIMARY READING MATERIALS

This chapter contains the findings from part one of the present experimental study, the analysis of sentences in primary reading materials. The two basal series included in this linguistic analysis were the Ginn Basic Readers and Nelson Young Canada Readers, hereafter referred to as Series A and B respectively. The trade books analysed were Beginner Books written by Dr. T.S. Geisel (Dr. Seuss) at a variety of levels. The selection and analysis of these materials are described in Chapter IV.

This chapter will present the percentage of sentences containing deletion produced structures in each level of the two basal series and the trade books. Information will also be presented on the percentage of sentences containing structures derived by application of each of the 12 different deletion transformations investigated in the study. Data will be provided for each level of each series to show progression within each series and also to show comparisons across materials. All data are presented in percentage form in order to make comparisons across reader levels possible.

I. OCCURRENCE OF DELETION PRODUCED STRUCTURES AS A GROUP

One of the most striking findings evident in Table III is the high incidence of deletion produced structures at the preprimer level, particularly in Series A. It is interesting to note, however, that 80.7 per cent of all deletion produced structures present in the Series A preprimers were imperatives. In Series B, only half of all deletion

TABLE III

PERCENTAGE OF SENTENCES CONTAINING DELETION PRODUCED STRUCTURES

			Levels				
Series	Preprimer	Primer	First Reader	Second Reader		Third Reader	
				I	II	I	II
Series A	78.9	25.5	28.1	31.1	39.9	39.1	47.0
Series B	42.6	28.4	23.4	34.2	32.6	34.7	53.1
Trade books		42.6	49.3	53.0		52.6	

produced structures were of this type. Fagan (1969) found that the imperative, which occurred relatively infrequently, was one of the 15 most difficult structures for his upper elementary sample.

There was a sharp drop in percentage of sentences produced by deletion transformations at the primer level and this reflected, to a large extent, a decrease in the use of imperatives. The percentages levelled off in the first readers although the decline in deletion produced structures continued to some extent for Series B.

At the second reader level, there was an increase in percentage of sentences containing deletion produced structures and then the percentages were fairly even to the beginning third reader level. There was a large increase at the high third reader level with approximately half of all sentences analysed containing deletion produced structures. It is commonly believed that there is a gap between the type of language in third- and fourth-grade basals (Fagan, 1969, p. 80), with a sharp increase in complexity at the fourth-grade level. The results of this analysis suggest that the increase in complexity begins at the high third reader level.

A second obvious discrepancy occurred between the number of deletion produced structures in the trade books and the basal readers at all except the high third reader level. The "imperative deletion" did not account for the large percentage of sentences containing deletions in trade books at the first-grade level as it had in the basal preprimers. Most deletion produced structures were employed to maintain the rhyme and rhythm of the stories.

From the analysis presented in this section, it appears that beyond the preprimer level, which contained a high percentage of deletion produced structures, Series A progressed steadily from level to level in percentage of sentences containing deletions. Progression was not as even in Series B with a dip at the first reader level and a sharp increase at the high third reader level. The trade books were much more consistent in percentage of deletion produced structures across levels.

II. PERCENTAGE OF OCCURRENCE OF EACH DELETION PRODUCED STRUCTURE

The data presented in this section will show the percentage of sentences containing each of the 12 deletion produced structures investigated in this study in each of the basal series and in the trade books. Linguistic formalization and examples of each of these deletion rules are provided in Chapter V.

Occurrence of Each Deletion Produced Structure in Series A

As indicated in Table IV, the imperative was the most frequently occurring deletion produced structure in sentence samples from the preprimer to beginning second reader levels of Series A. The percentage

TABLE IV

PERCENTAGE OF DELETION PRODUCED STRUCTURES FOR EACH TRANSFORMATION RULE IN SERIES A

Transformation Rules				Levels			
	Preprimer	Primer	First Reader	Beginning Second	High Second	Beginning Third	High Third
WH deletion	0.8	0.0	1.6	3.2	3.5	4.6	2.2
BE deletion	1.9	3.4	5.3	7.0	4.7	3.2	7.8
WH + BE deletion	4.8	16.4	10.0	12.4	13.7	15.2	12.9
(That) + S as Object	0.0	0.8	3.0	4.3	6.7	7.4	7.5
Performative deletion	4.3	2.7	3.7	2.7	2.3	2.1	1.9
Imperative deletion	80.7	40.5	43.0	27.4	16.1	9.2	6.2
Preposition (infinitive) deletion	0.02	1.5	0.8	2.2	0.9	3.5	1.3
Verb phrase deletion	1.6	8.0	7.5	4.8	10.2	8.5	11.8
Noun phrase deletion	0.02	8.4	8.1	14.0	11.7	19.8	14.0
Noun phrase + auxiliary (verb) deletion	4.0	11.1	7.1	11.8	18.7	10.3	16.1
Noun phrase + verb + other elements deletion	1.5	5.0	4.3	8.1	7.9	12.0	14.5
Comparative deletion	0.0	2.3	5.7	2.2	3.5	4.2	3.8

of imperatives was very high at the preprimer level (80.7 per cent), dropped sharply at the primer level, levelled off and then dropped again at the beginning second reader level. Percentage of imperatives continued to decline steadily until at the high third reader level, only 6.2 per cent of all structures produced by deletion transformations were of this type. Fagan (1969) also found a relatively small number of imperatives in the fourth-grade basals analysed in his study.

A second type of deletion produced structure which decreased over the grade levels was that derived from application of the "performative deletion". This structure was third in frequency at the preprimer level but occurred very infrequently by the third reader level.

Several deletion produced structures increased in percentage of occurrence over the reader levels. Percentages of common elements deletions, particularly those for "noun phrase" and "noun phrase + auxiliary (verb)" deletions, were within the upper third of deletion produced structures at all grade levels. There were slightly fewer "verb phrase" and "noun phrase + verb + other elements" deletions at most levels. The percentage of each common elements deletion tended to increase with reading level of materials. This tendency was also evident for the "(that) + S as object" transformation which did not occur at all in the preprimer level and ranked seventh in percentage of occurrence at the high second and third reader levels.

Structures produced by the "WH + BE deletion" were among the most frequent in all levels of Series A, ranging from second to fourth in percentage of occurrence. Beyond the preprimer level, where all percentages except that for "imperative deletions" were below five per cent, occurrence relative to other deletion produced structures remained fairly stable between 10.0 and 16.4 per cent.

The remaining deletion transformations, namely the "comparative", "WH", "BE" and "preposition" deletions, accounted for only small percentages of the deletion produced structures at any level. Occurrence tended to increase after the mid-first grade level and then remain fairly steady relative to other deletions.

Occurrence of Each Deletion Produced Structure in Series B

The overview of deletions in Series B presented in Table V shows that the imperative was the most frequently occurring deletion produced structure in all first- and second-grade texts, and that the relative number of imperatives decreased as reading levels increased. The imperative ranked second in frequency at the beginning third reader level but dropped to sixth in the high third reader. The "performative deletion", which occurred infrequently at all levels, also tended to decrease in percentage occurrence although there was a slight increase at the third reader levels.

Trends were not as clearcut for most other deletion transformations. The "WH + BE deletion", for example, was second in frequency in all first-grade texts, tended to decrease in occurrence, and then increase again at the high third reader level.

Common elements deletions, particularly "noun phrase + auxiliary (verb) deletion", tended to rank in the upper third of all deletion produced structures at all reader levels. The "verb phrase deletion" occurred relatively frequently in the first and beginning second-grade readers, but decreased beyond these levels. Percentage of occurrence of "noun phrase deletion" and "noun phrase + verb + other elements

TABLE V

PERCENTAGE OF DELETION PRODUCED STRUCTURES FOR EACH TRANSFORMATION RULE IN SERIES B

Transformation Rules	Levels						
	Preprimer	Primer	First Reader	Beginning Second	High Second	Beginning Third	High Third
WH deletion	0.0	0.0	1.2	3.9	7.2	5.6	10.4
BE deletion	5.5	3.4	2.6	4.3	5.5	3.1	2.7
WH + BE deletion	11.0	16.4	15,8	9.0	7.7	6.2	9.6
(That) + S as object	1.5	0.8	5.3	6.2	9.8	12.1	5.6
Performative deletion	2.6	2.7	1.2	0.4	0.0	0.3	1.1
Imperative deletion	51.5	40.5	31.7	25.7	15.7	18.3	8.3
Preposition (infinitive) deletion	1.8	1.5	2.6	3.1	5.5	0.9	0.8
Verb phrase deletion	9.9	8.0	8.2	15.6	6.4	5.4	4.8
Noun phrase deletion	0.7	8.4	7.6	12.5	12.8	23.1	27.5
Noun phrase + auxiliary (verb) deletion	11.4	11.1	15.0	9.3	14.0	9.6	16.0
Noun phrase + verb + other elements deletion	4.0	5.0	5.3	7.8	10.6	9.6	16.0
Comparative deletion	0.0	2.3	3.5	2.3	4.7	5.9	5.3

deletion" increased over the reader levels and ranked first and second respectively by the high third reader level.

Other deletion produced structures which tended to increase in frequency over the levels were "WH deletion" and "comparative deletion". The "WH deletion" was not represented in any deletion produced structures at the preprimer and primer levels, but increased to fourth in percentage of occurrence by the high third reader level. The "comparative deletion" occurred with relatively low frequency at all levels. Structures derived by "(that) + S as object" also tended to increase in percentage frequency until the high third reader level when a decrease was evident. This was a rare deletion at the preprimer and primer levels and increased in occurrence to third in the beginning third reader.

No trends were apparent for two other infrequently occurring structures, those produced by "preposition deletion" which were very rare at all levels, and those produced by "BE deletion" which ranged from 2.6 to 5.5 in percentage of occurrence at the various levels.

Occurrence of Each Deletion Produced Structure in the Trade Books

Only five different deletion produced structures identified in this study occurred in either Hop on Pop or Green Eggs and Ham. Table VI shows that four of these were the same for both books, namely "BE deletion", "imperative deletion", "noun phrase + auxiliary (verb) deletion", and "noun phrase + verb + other elements deletion". In addition, "verb phrase deletion" occurred in Hop on Pop and "noun phrase deletion" in Green Eggs and Ham. The most frequently occurring structure in the primer level was produced by application of "BE

TABLE VI

PERCENTAGE OF DELETION PRODUCED STRUCTURES FOR EACH TRANSFORMATION RULE IN TRADE BOOKS

Transformation Rules	Levels Primer Hop on Pop	First Reader Green Eggs and Ham	Second Reader The Cat in the Hat	Third Reader Horton Hears a Who
WH deletion	0.0	0.0	4.4	0.8
BE deletion	37.9	8.8	10.4	10.4
WH + BE deletion	0.0	0.0	5.2	15.8
(That) + S as object	0.0	0.0	4.4	7.5
Performative deletion	0.0	0.0	3.5	0.0
Imperative deletion	13.8	8.8	26.1	20.8
Preposition (infinitive) deletion	0.0	0.0	0.0	1.7
Verb phrase deletion	10.3	0.0	7.8	1.7
Noun phrase deletion	0.0	13.2	0.9	7.5
Noun phrase + auxiliary (verb) deletion	24.3	27.8	20.9	18.3
Noun phrase + verb + other elements deletion	13.8	41.2	13.9	12.5
Comparative deletion	0.0	0.0	2.6	3.3

deletion" and in the first reader level by "noun phrase + verb + other elements deletion". The "noun phrase + auxiliary (verb) deletion" occurred second in percentage frequency in both books. Several deletions never occurred. These were "WH", "WH + BE", "(that) + S as object", "performative", "preposition" and "comparative" deletions. This may be partially accounted for by the fact that these books contain a great deal of repetition of both words and sentence structures and hence, a small number of deletion produced structures was used again and again. The sample of sentences was also much smaller from these two trade books than from basals at similar levels.

As the trade books became more difficult, nearly all of the deletion transformations investigated in this study were represented. The "imperative deletion" occurred most frequently of all deletion produced structures in both The Cat in the Hat and Horton Hears a Who, with "noun phrase + auxiliary (verb) deletion" second in percentage of occurrence. The "noun phrase + verb + other elements deletion" also occurred relatively frequently in both books as did the "BE deletion". Relatively infrequent structures involved the "comparative", "performative" and "preposition" deletions as well as "WH deletion" in Horton Hears a Who and "noun phrase deletion" in The Cat in the Hat.

Comparison by Transformation Rules Across Materials

An earlier section discussed comparisons among the two basal series and trade books in terms of total number of deletion produced structures present at each level. This section will present data for comparison purposes at each reader level on specific deletion produced structures. In Figures 5 to 11 transformation rules are numbered rather than named with numbers corresponding to transformation rules as indicated on pages 95 to 97.

Comparison by Transformation Rules at the First Grade Level. Figure 5 presents graphic data depicting the deletion produced structures found in sentence samples from Series A and B preprimers. The predominance of "imperative deletions" was evident in both series although this transformation accounted for four-fifths of the deletion produced structures in Series A and only slightly over half in Series B preprimers. Most other deletion produced structures occurred at higher percentages in Series B than in Series A. The "WH + BE deletion", for example, ranked second in frequency in Series A and third in Series B but the percentage of occurrence was considerably higher in Series B. The percentage occurrence for common elements deletions was also considerably higher in Series B with "noun phrase + auxiliary (verb) deletion" ranking second after the "imperative deletion". The rank order of common elements deletions was similar in the two series, with "noun phrase + auxiliary (verb) deletion" occurring most frequently, "verb phrase deletion" second, and "noun phrase + verb + other elements deletion" third.

There were no "comparative deletions" present in sentences for either Series A or B preprimers. For several other rules, namely "WH deletion", "(that) + S as object", "noun phrase deletion" and "preposition deletion", the percentage of occurrence was zero or very small.

One of the few structures which occurred more frequently in Series A than B preprimers was that involving "performative deletion". This was third in frequency of occurrence in Series A and seventh in Series B.

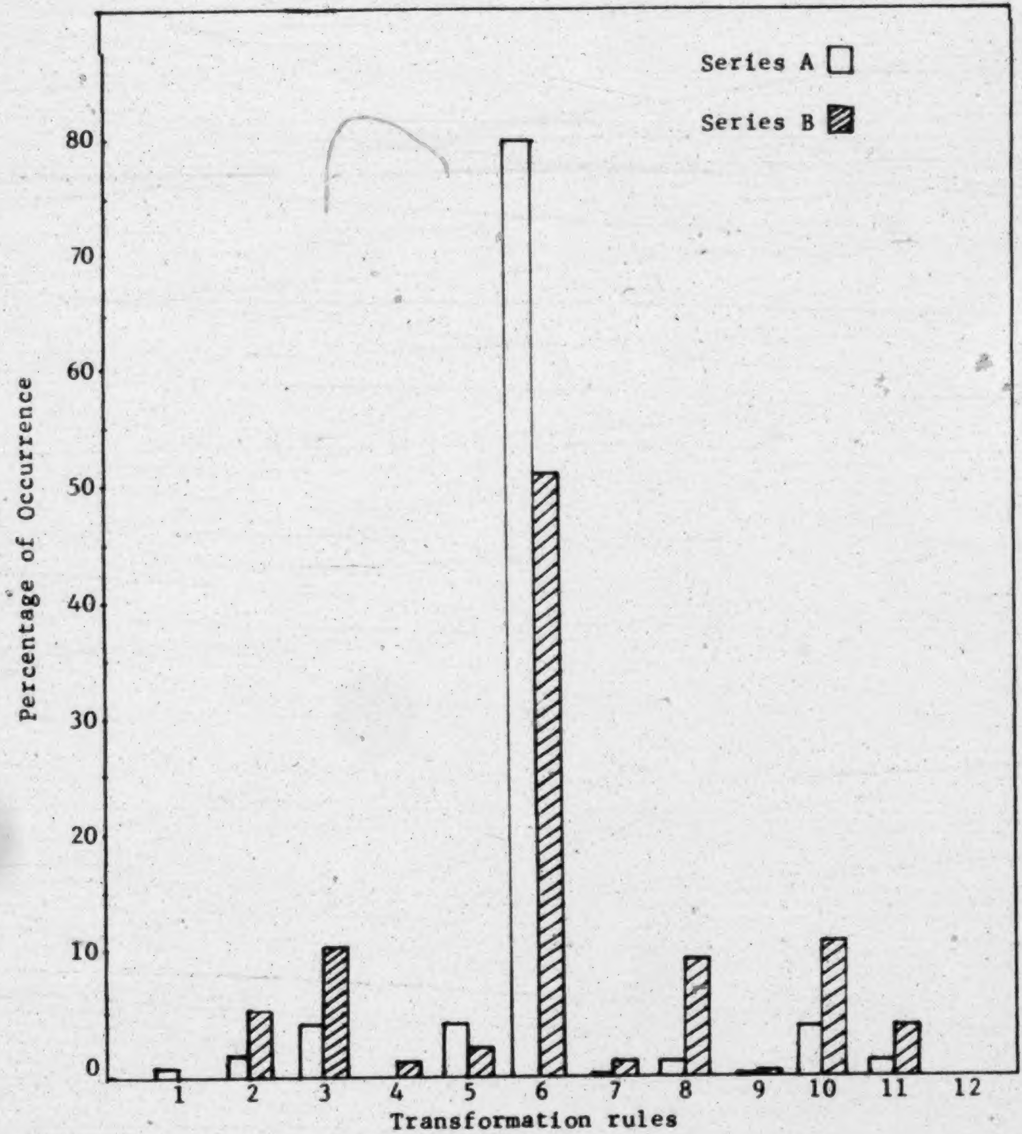

FIGURE 5

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE PREPRIMER LEVEL

The percentage of occurrence for each deletion produced structure present in the basals and trade book at the primer level is shown in Figure 6. As at the preprimer level, the most frequently occurring deletion in the basals was the "imperative" although the percentages decreased from 80.7 to 55.7 per cent in Series A, and from 51.5 to 40.5 per cent in Series B. Again most deletions other than the "imperative deletion" occurred at a higher percentage in Series B than in Series A. The exceptions to this were "BE deletion" which ranked second in Series A and seventh in Series B, "WH deletion" which did not occur in Series B, and "preposition deletion". The "WH + BE deletion" was the second most frequently occurring structure in Series B and was fourth in Series A. Common elements deletions ranked in the top half of deletion produced structures investigated in this study although these tended to occur at a considerably higher percentage in Series B than A. Deletion produced structures which continued to occur infrequently at the primer level were "(that) + S as object", "comparative deletion", "preposition deletion", and also the "performative deletion".

The trade book analysed at the primer level showed little similarity in occurrence of deletion produced structures to the basals. "WH + BE deletions" were the most frequently occurring structure, with "noun phrase + auxiliary (verb) deletion" second and the "noun phrase + verb + other elements" and "imperative" deletions third. Several of the deletion produced structures which did not occur in the trade book were rare in the basals although this was not always true.

Figure 7 presents a comparison of deletion produced structures in first reader basals and the trade book at this level. Although there was a further decrease in the percentage of "imperative deletions"

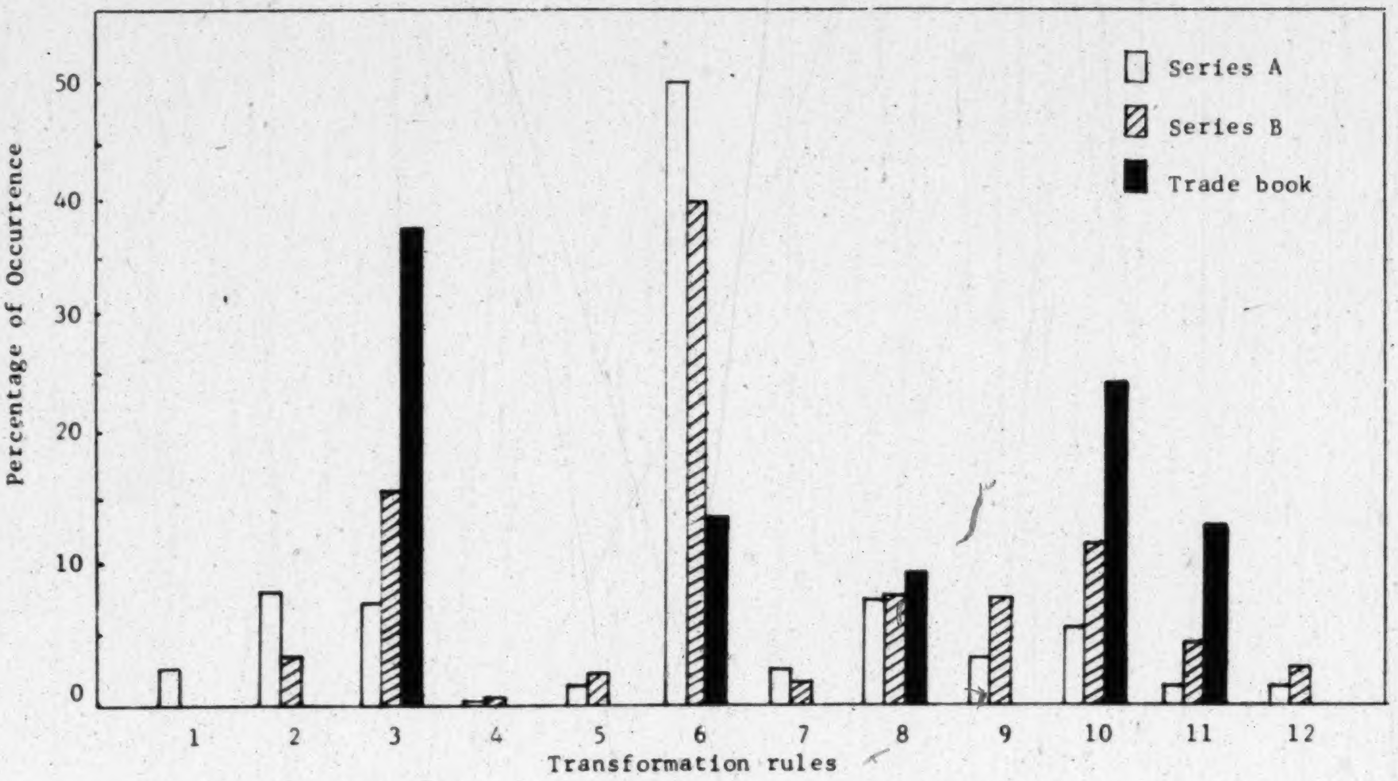

FIGURE 6

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE PRIMER LEVEL

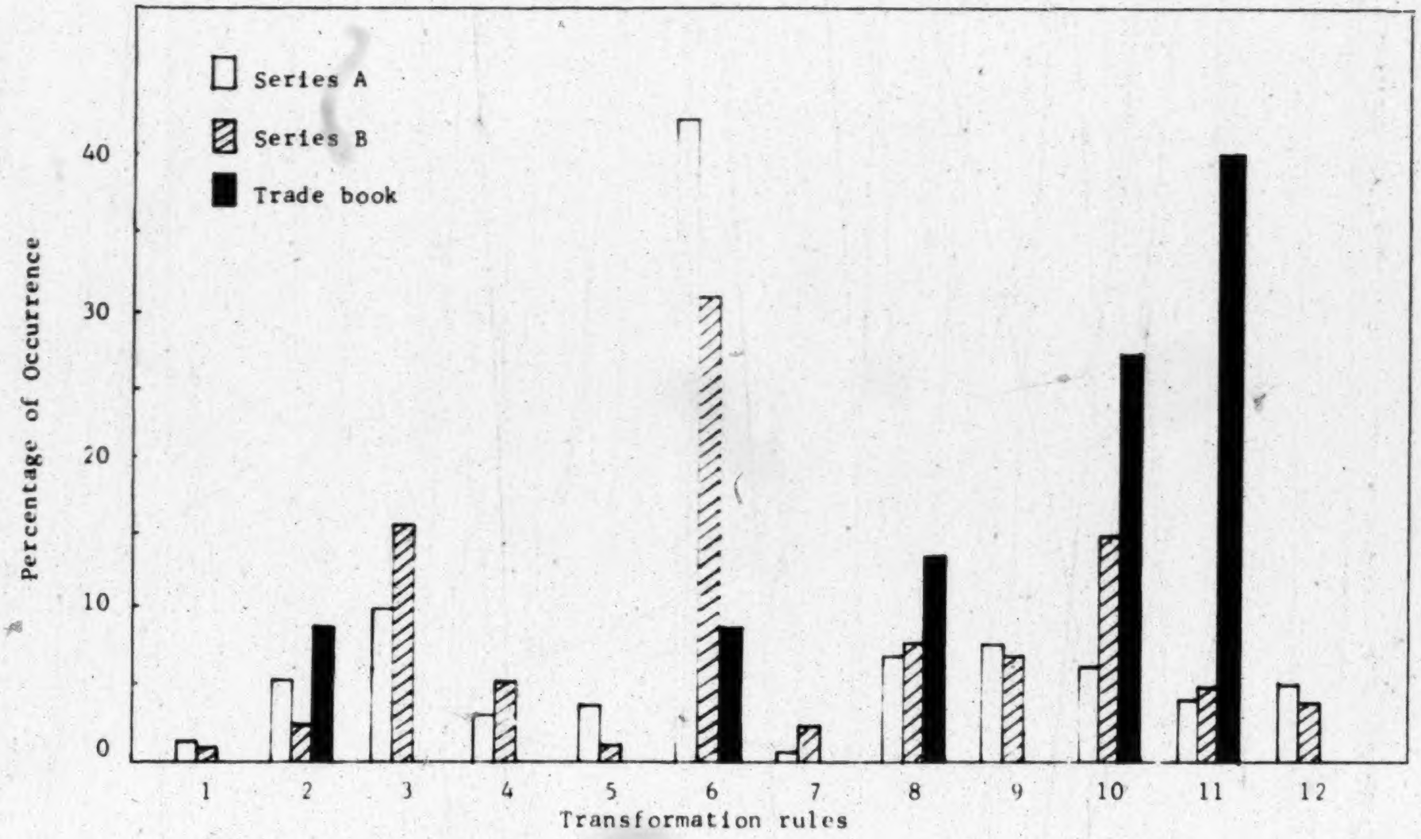

FIGURE 7

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE FIRST READER LEVEL in the basal series, this was still the most frequently occurring deletion produced structure. The "WH + BE deletion" transformation ranked second in percentage of occurrence in both series with the common elements deletions, "noun phrase", "noun phrase + auxiliary (verb)", and "verb phrase" deletions, coming next. At this level, there was no longer a higher percentage of most deletion produced structures in Series B than A, with the two series showing more similarity. Infrequent structures included the "BE", "performative", and "preposition" deletions.

As at the primer level, there was little similarity between the pattern of deletion produced structures present in the basals and the pattern in the trade book Green Eggs and Ham.

Comparison by Transformation Rules at the Second Grade Level. Data for the beginning second reader level of Series A and B as well as for The Cat in the Hat are presented in Figure 8. The percentage of occurrence for "imperative deletions" was still highest in both Series but there was no longer a large discrepancy in percentages between the two series. Common elements deletions were second in frequency and the "WH + BE deletion" also occurred frequently in both series. Both contained a very small percentage of "comparative", "preposition", "performative", and "WH" deletions. Again there was considerable similarity between the two basal series.

As in the beginning second reader basals, The Cat in the Hat contained more "imperatives" than any other deletion produced structure. Common elements deletions, "noun phrase + auxiliary (verb)" and "noun phrase + verb + other elements" deletions, also ranked second

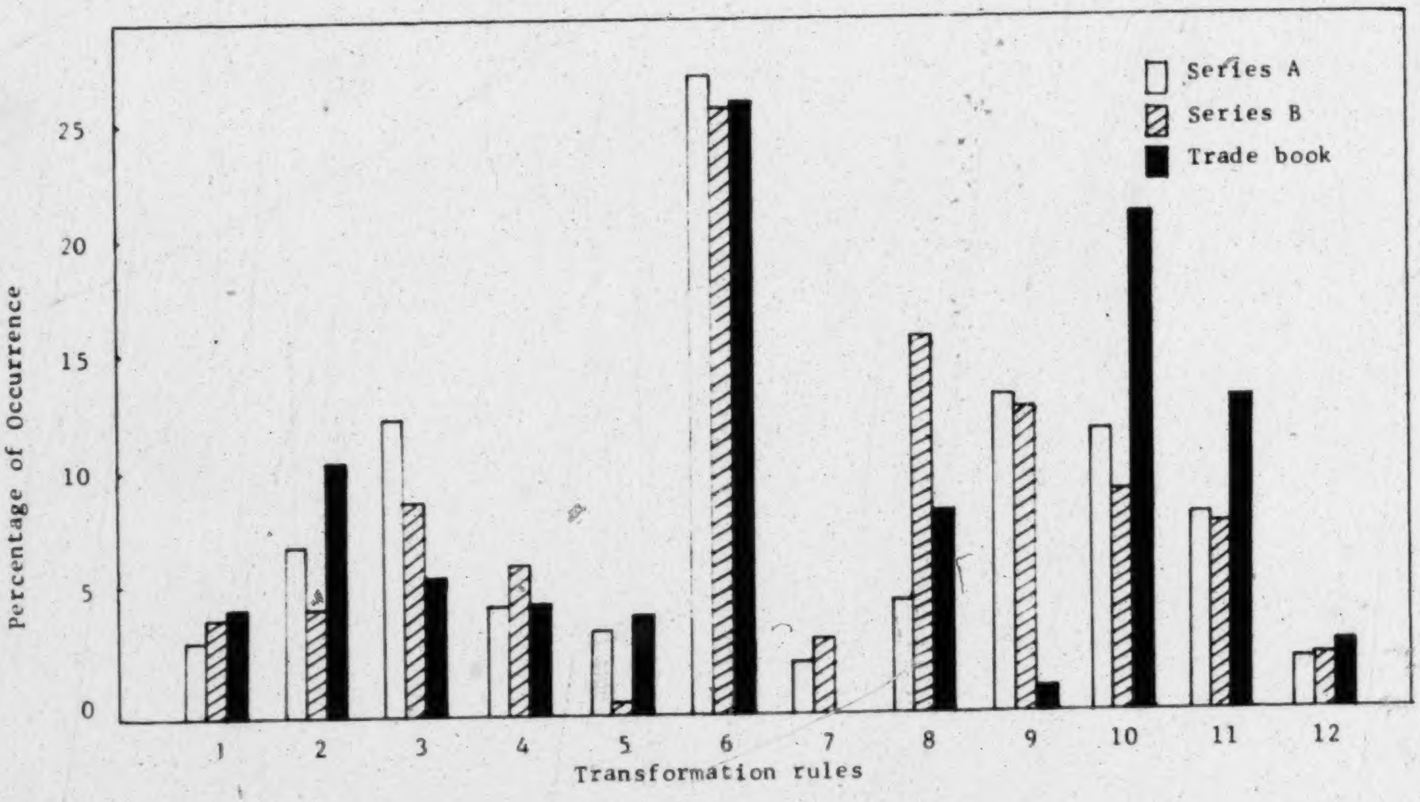

FIGURE 8

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE BEGINNING SECOND READER LEVEL and third respectively. The "BE deletion", however, ranked fourth and this structure was eighth in Series A and ninth in Series B. Several structures occurred infrequently in both the basals and the trade book, namely "comparative", "preposition", and "performative" deletions, but "noun phrase deletion" was very rare in the trade book as well and this structure ranked third and fourth in Series B and A respectively.

At the high second reader level, the "imperative deletion" dropped to second place in percentage of occurrence in Series A but retained its predominance in Series B (See Figure 9). The "noun phrase + auxiliary (verb) deletion" ranked first in Series A and second in Series B. There were only small differences among the percentages of each of these transformation rules in the two series with percentages ranging from 14.0 to 18.7 per cent. The "WH + BE deletion" ranked third in Series A with "noun phrase deletion" fourth. The "noun phrase deletion" ranked third in Series B and "noun phrase + verb + other elements deletion" fourth. The three deletion produced structures which occurred with least frequency in both series included the "performative", "comparative", and "preposition" deletions.

Comparison by Transformation Rules at the Third Grade Level. As can be seen from data in Figure 10, the most frequently occurring deletion in Series A and B at the beginning third reader level was the "noun phrase deletion". The "imperative deletion" ranked second in Series B but this deletion had dropped to sixth in frequency of occurrence in Series A. The "WH + BE deletion" was second in Series A. Both series contained several "noun phrase + auxiliary (verb)" and

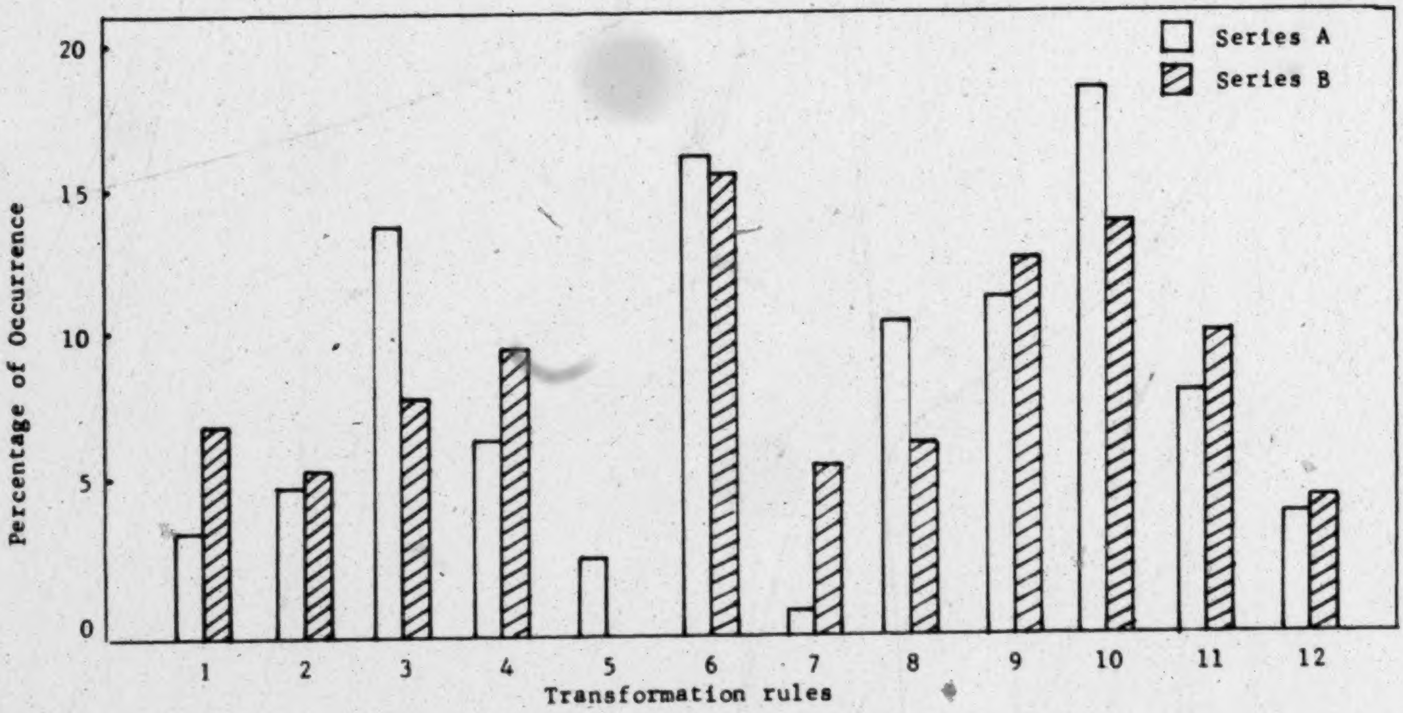

FIGURE 9

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE HIGH SECOND READER LEVEL

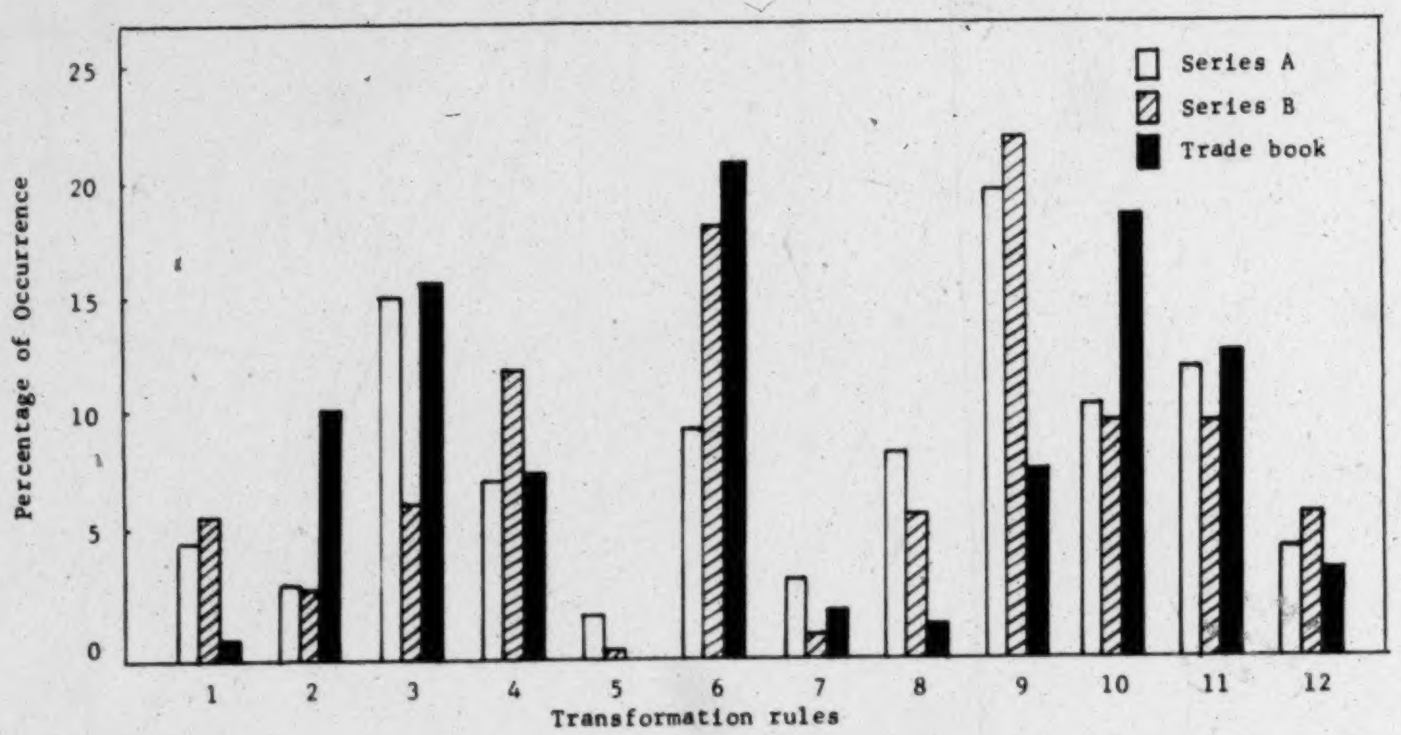

FIGURE 10

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE BEGINNING THIRD READER LEVEL "noun phrase + verb + other elements" deletions. Although there was little consistency between the basals in the second and third most frequently occurring deletions, the three least frequent deletion produced structures involved the same transformations, "performative deletion", "BE deletion", and "preposition deletion".

The highest percentage of occurrence for any deletion produced structure in Horton Hears a Who was for the "imperative deletion". This is reminiscent of earlier levels of the basal readers. The second most frequently occurring structure was that produced by "noun phrase + auxiliary (verb) deletion"; "WH + BE deletion" ranked third and "noun phrase + verb + other elements deletion" fourth. These also occurred frequently in the third reader basals and, as in the basals, the "performative" and "preposition" deletions occurred infrequently. However, "BE deletion", which had been rare in the beginning third readers, ranked fifth in percentage of occurrence in Horton Hears a Who.

The percentage of sentences containing deletion produced structures increased markedly at the high third reader level. Figure 11 gives a breakdown of data by transformation rules for basals at this level. Three common elements deletions, "noun phrase + auxiliary (verb) deletion", "noun phrase deletion", and "noun phrase + verb + other elements deletion", ranked as the first three deletions in percentage of occurrence in both Series A and B. The "WH + BE deletion" also occurred relatively often in both series, but there were differences between the two on "WH", "BE", and "verb phrase" deletions. The two least frequent deletion produced structures involved "preposition" and "performative" deletions for both Series A and B.

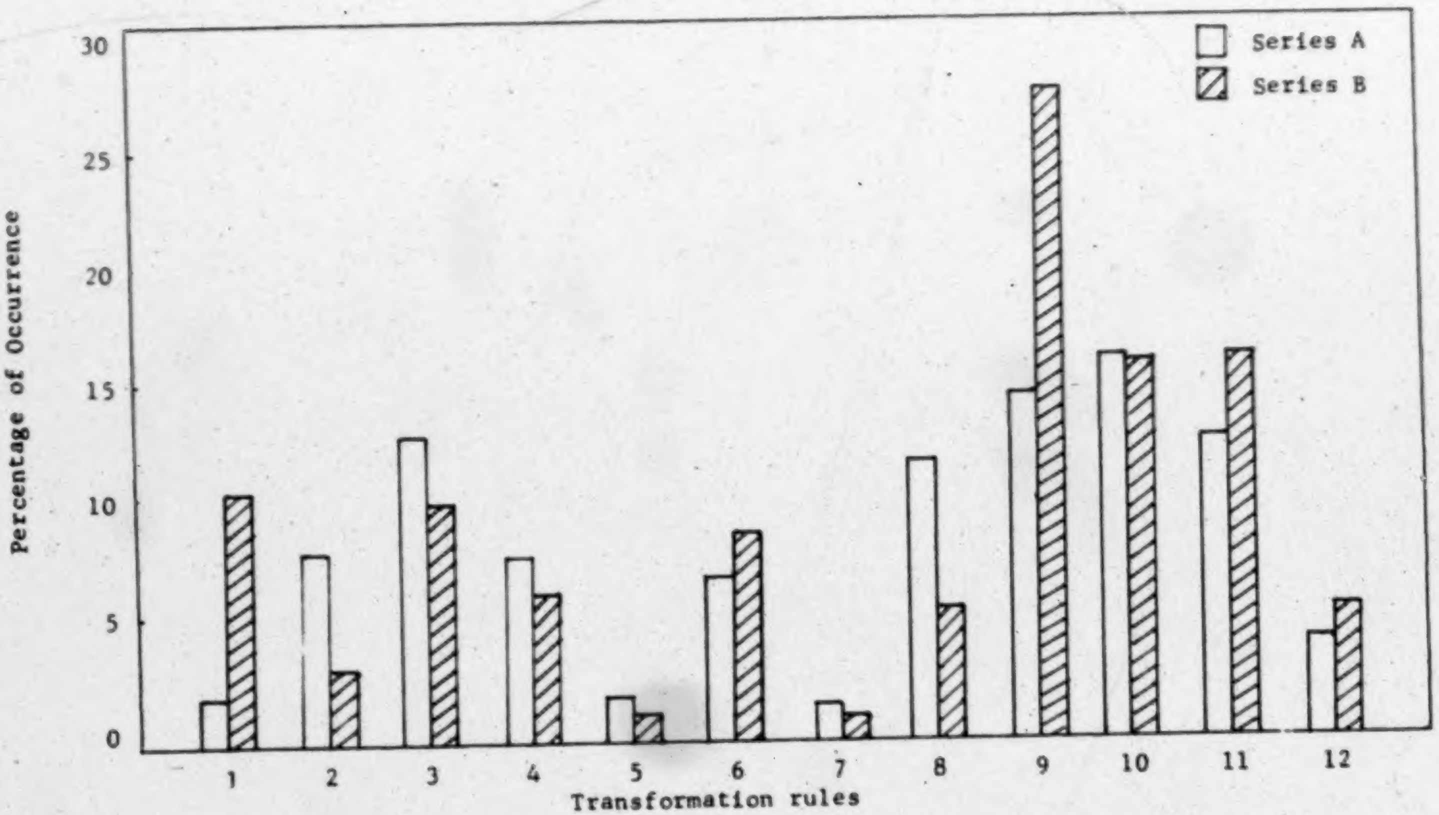

FIGURE 11

PERCENTAGE OF OCCURRENCE OF TRANSFORMATION RULES AT THE HIGH THIRD READER LEVEL

III. SUMMARY

There was a high incidence of sentences containing deletion produced structures in the basal preprimers, particularly in Series A. Percentages of sentences produced by deletion transformations dropped sharply at the primer level, gradually increased to the beginning third reader level, and then increased markedly in the high third readers. Trade books contained a higher percentage of deletion produced structures than basals at all reading levels except the high third-grade level.

There was little increase across reading levels in percentage of sentences produced by deletion transformations in the trade books. They contained few different deletion produced structures at the lower levels but at the higher levels, were more similar to the basals.

In all basal readers analysed from the preprimer to beginning second reader levels, the most frequently occurring deletion was the "imperative". There was a marked decline in presence of "imperative deletions" from preprimer to high third reader levels. In the Dr. Seuss books, the opposite trend occurred with the "imperative deletion" ranking fourth in those at the first-grade levels and first at the second- and third-grade levels.

Common elements deletions also occurred frequently in both basals and trade books. Of the common elements deletions investigated in this study, the "noun phrase + auxiliary (verb) deletion" occurred most frequently, "noun phrase" and "noun phrase + verb + other elements" deletions were second in frequency, and the "verb phrase deletion" was third.

The only other deletion produced structure to occur relatively frequently in all materials was that involving application of the "WH + BE deletion". This structure occurred frequently in all levels of Series A, in the first-grade levels of Series B, and in the second-and third-grade trade books. Fagan (1969) found that the two most frequently occurring deletion transformations in fourth-grade basals were the "common elements deletion" and "WH + BE deletion". The "imperative" was a relatively infrequent structure.

Deletion produced structures which occurred with the least frequency in all materials analysed in this study included those involving the "performative", "preposition", and "comparative" deletions. Sentences produced by "BE deletion" were also rare in the basals, but relatively frequent in the trade books.

CHAPTER VII

FINDINGS: EFFECT OF DELETION PRODUCED STRUCTURES ON COMPREHENSION

This chapter will examine the data obtained from administration of the experimental cloze tests containing deleted and intact sentence structures. First, validity of the cloze tests at each grade level will be discussed. Final validity for these tests could not be established until all data had been collected. Following this a comparison will be made between performance on deleted and intact sentence structures for number of exact replacements, type of errors and location of exact replacements. Comparisons among transformation rules will also be discussed.

I. VALIDITY OF THE CLOZE TESTS

In order to ensure a representative sample of test items, grade one pupils completed between 96 and 106 cloze blanks. The number of items completed by pupils at the second-grade level ranged from 111 to 129.

This study employed an oral response to the cloze at the first-grade level and results of the pilot study suggested that this was a valid test of comprehension. However, the correlation between scores obtained on the cloze and those on the comprehension subtest of the Gates-MacGinitie Reading Tests ($r = 0.526$) were not as high as expected because of the nature of the pilot study sample. When the test sample for the major study was considered, as Table VII indicates, the correlation coefficient of 0.738 was much more satisfactory.

At the second-grade level, the relationship between performance

TABLE VII

CORRELATIONS BETWEEN GATES-MACGINITIE COMPREHENSION SCORES AND THOSE ON THE CLOZE TESTS

Grade	Mean Cloze Scores	Standard Deviation	Correlation Coefficient
1	.329	.145	.738**
2	.357	.136	.744**

** Significant at the .001 level of confidence

on written cloze tests and the Gates-MacGinitie comprehension subtest scores was again highly significant. The similarity of the means, standard deviations, and correlation coefficients for both an oral and written response to the cloze suggests that a similar factor is being measured with the two formats.

II. NUMBER OF EXACT REPLACEMENTS ON DELETED AND INTACT SENTENCE STRUCTURES

The number of exact replacements was tabulated in relation to the total number of cloze items, first, for all words excluding those which could be affected by deletion transformations, and, second, with inserted words taken into account. These were converted to proportion scores since the number of cloze blanks varied across test sentences.

Table VIII presents a comparison of exact replacements on deleted and intact sentence structures including inserted words. Results indicate a tendency for deletion produced sentence structures to be more difficult than those with all words left intact. When transformation rules were considered as a group, grade one pupils performed signifi-

TABLE VIII

MEANS, STANDARD DEVIATIONS AND t-TEST RESULTS OF COMPARISONS BETWEEN NUMBER OF EXACT CLOZE REPLACEMENTS ON DELETED AND INTACT SENTENCE STRUCTURES WITH WORDS THAT COULD BE AFFECTED BY DELETION TRANSFORMATIONS CONSIDERED

Transformation Rule	GRADE 1					GRADE 2				
	Deleted		Intact			Deleted		Intact		
	Mean	Standard Deviation	Mean	Standard Deviation	"t"	Mean	Standard Deviation	Mean	Standard Deviation	"t"
WH deletion	.350	.319	.349	.293	0.093	.385	.248	.375	.256	0.401
BE deletion	.356	.372	.383	.345	-0.731	.279	.283	.356	.260	-2.893**
WH + BE deletion	.310	.252	.264	.229	2.133*	.309	.236	.293	.208	0.751
(That) + S as object	.428	.308	.382	.304	1.483	.400	.190	.310	.210	0.129
Performative deletion	.235	.368	.320	.322	-2.161**	.307	.356	.439	.377	-3.546**
Imperative deletion	.269	.262	.237	.300	1.003	.376	.334	.374	.328	0.058
Preposition deletion	.346	.303	.324	.253	0.683	.427	.308	.402	.282	0.820
Verb phrase deletion	.380	.336	.406	.286	-0.771	.394	.277	.448	.252	-2.254*
Noun phrase deletion	.337	.288	.331	.297	0.177	.355	.288	.292	.234	2.402*
Noun phrase + auxiliary (verb)	.208	.252	.255	.257	-1.648	.334	.294	.370	.321	-0.973
Noun phrase + verb + other elements	.323	.249	.388	.276	-2.433**	.301	.220	.368	.230	-3.457**
Comparative deletion	.368	.282	.403	.291	-1.171	.170	.160	.330	.180	-5.928**
Combined rules	.323	.159	.343	.150	-2.684**	.356	.145	.351	.143	-0.455

* Significant at the .05 level of confidence
** Significant at the .01 level of confidence

cantly better on sentences containing words affected by deletion transformations than on those in which words had been deleted. The effect of deletion produced structures on grade two pupils was not as clear-cut although there were significant differences between intact and deleted forms for several transformation rules.

Subjects in both grades one and two found the intact form of the performative sentence structure significantly easier than the deleted form. This difference appeared to be due to the ease of the inserted words themselves since a comparison of the deleted and intact forms ignoring inserted words revealed no significant difference for the second-grade sample and the deleted form somewhat easier at the first-grade level. "Performative deletions" occurred infrequently in all basal readers beyond the primer level.

Differences significantly favored the intact form of sentences involving the "noun phrase + verb + other elements deletion" at both grade levels. The intact form was also easier when words affected by deletion transformation were excluded but these differences did not reach significance. There are several redundant words in the intact form of this sentence structure and presence of this redundant information appeared to aid performance on the cloze tests.

Two other common elements deletions, "verb phrase deletion" and "noun phrase deletion", were significantly easier for grade two pupils in intact than deleted form. Although the intact form was also easier for grade one subjects, differences between performance on the two forms were not significant. The inserted words contributed considerably to the ease of the intact form. When these words were discounted, second-grade pupils actually found the deleted form easier.

Sentences produced by application of "BE deletion" were also significantly more difficult than the intact form for second-grade pupils. The intact form was easier at the first-grade level as well, but not significantly so. Few deletion produced structures present in basal readers were produced by the "BE deletion" transformation but the trade books contained a large number of these.

The comparative was significantly more difficult in deleted form at both grade levels when inserted words were excluded from the analysis. When these words were included, differences continued to favor the intact form but these were significant at only the second-grade level. Hence, the inserted word itself was not easy to predict. "Comparative deletions" generally involve optional deletion of the copula or verb and children find it difficult to predict this word. However, when the word is present, they can use this to help comprehend the rest of the sentence. These usually occur at the end of sentences, and this suggests that pupils searched ahead and made predictions of meaning on the basis of both preceding and subsequent context.

A final sentence structure which tended to be more difficult in deleted form than in intact form was that involving "noun phrase + auxiliary (verb) deletion". Differences were not significant at either grade level.

Results obtained on sentences involving three deletion transformations revealed the opposite trend to those reported above. "WH + BE" sentence structures were significantly easier in deleted form for grade one pupils and although a similar trend was noted at the second-grade level, differences were not significant. This is a frequently occurring sentence pattern at all reader levels. A similar trend was noted for two other deletion transformations, "preposition deletion" and "(that) + S as object". Fagan found that "(that) + S as object" was not significantly related to sentence or passage difficulty at the grade four level and to sentence difficulty only for the total group.

No trend was evident for two other deletion transformations. Children in this study tended to respond similarly to deleted and intact structures involving the "imperative" and "WH" forms. Presence of "WH" and "imperative" deletions was significantly related to sentence and passage difficulty at all three grade levels in Fagan's study (1969). It is interesting to note that "imperative deletions" occurred much more frequently in primary basals than in those at the fourth-grade level.

Difficulty of Deletion Transformations by Number of Exact Replacements

Table IX shows the relative difficulty of deleted structures produced by each of the 12 deletion transformations investigated in this study at the grade one and two levels. Deletion transformations have been rank ordered by proportion of exact replacements including words affected by deletion transformations. There is little consistency between the two grade groups in structures found most difficult. The most striking inconsistencies are on the "comparative" and "BE" deletions. These were the first and second most difficult deletion produced structures for the second-grade group but were third and fourth easiest for first graders. One possible reason that the "comparative" was more difficult for second- than first-grade subjects is the nature of the test sentences. Several of the second reader

TABLE IX

DELETION TRANSFORMATIONS RANKED FROM MOST TO LEAST DIFFICULT IN TERMS OF MEAN PROPORTION OF EXACT CLOZE REPLACEMENTS WITH WORDS THAT COULD BE AFFECTED BY DELETION TRANSFORMATION RULES CONSIDERED

GRADE 1		GRADE 2	
Transformation Rule	Mean	Transformation Rule	Mean
Noun phrase + auxiliary (verb) deletion	.208	Comparative deletion	.170
Performative deletion	.235	BE deletion	.279
Imperative deletion	.269	Noun phrase + verb + other elements	.301
WH + BE deletion	.310	Performative deletion	.307
Noun phrase + verb + other elements	.323	WH + BE deletion	.309
Noun phrase deletion	.337	Noun phrase + auxiliary (verb) deletion	.334
Preposition deletion	.346	Noun phrase deletion	.355
WH deletion	.350	Imperative deletion	.376
BE deletion	.356	WH deletion	.385
Comparative deletion	.368	Verb phrase deletion	.394
Verb phrase deletion	.380	(That) + S as Object	.400
(That) + S as Object	.428	Preposition deletion	.427

"comparative deletions" involved the copula whereas most of the first-grade items involved other verbs as in they ran as fast as they could (run). Structures involving the copula tended to be more difficult than the others. Fagan (1969) also found the "comparative deletion" to be significantly related to passage and sentence difficulty and among the 15 most difficult transformations investigated in his study. The test items for "BE deletion", on the other hand, were very similar across grades and do not provide a source for this discrepancy.

Interestingly, very difficult deletion produced structures tended to be those on which differences between intact and deleted forms significantly favored the intact form. From cloze test results it appears that comprehension of very difficult deletion produced structures is enhanced by inserting words affected by deletion transformations. This was true for the "comparative", "BE", "noun phrase + verb + other elements", and "performative" deletions. Fortunately, all of these deletions, with the exception of "noun phrase + verb + other elements deletion", occurred with relatively low frequency in basal reading materials.

Grade one pupils also found the "noun phrase + auxiliary (verb) deletion" difficult and unlike those reported above, this is a very frequently occurring sentence pattern in both primer and first reader basal materials. Insertion of words affected by deletion transformations did not significantly affect cloze results on this deletion produced structure although there was some improvement. This was also true of the "imperative deletion", third in difficulty for grade one pupils, and a very frequently occurring deletion produced structure in all first-grade basals. One other difficult deletion produced structure for pupils in both grades was that involving the "WH + BE deletion" and this structure was more difficult with the words affected by the deletion transformation inserted. This may reflect difficulty with comprehension of the connective. In Robertson's study (1966), the relative pronouns, especially which, were relatively difficult connectives to comprehend. Fagan (1969) also found the "WH + BE deletion" significantly related to both sentence and passage difficulty and among the 15 most difficult transformations in his study.

There was somewhat more consistency between grade groups on which deletion produced structures were relatively easy. Pupils in both grades one and two found "(that) + S as object" and "verb phrase deletion" among the easiest quarter of all deletion produced structures. The "(that) + S as object" transformation was one of the 15 easiest in Fagan's study.

Sentences produced by "WH" and "preposition" deletions also fell into the easier half of deletions investigated in this study, being somewhat easier for the second- than first-grade subjects.

Of the relatively easy deletion produced structures, only one, that produced by "verb phrase deletion", was significantly easier in intact than deleted form and this was at the second-grade level. On the others, insertion of words affected by deletion transformations did not contribute to increased cloze scores. It is interesting to note that most of these relatively easy structures, with the exception of "verb phrase deletion", involved deletion of only one word and hence, insertion added only one word. In intact sentences for the "verb phrase deletion", however, a considerable amount of redundant information was added and this redundancy appeared to aid comprehension as indicated by the cloze test results. It is also interesting to note that most of the words affected by these relatively easy deletion transformations were syntactic markers such as that, to and which rather than contentives (largely nouns and verbs).

Spontaneous Changes in Relation to Number of Exact Replacements

Special attention was paid to cloze responses which changed sentences from deleted to intact form or from intact to deleted form. Differences significantly favored the intact form of performative sentences for both grade samples and a large number of errors involved spontaneous insertion of words affected by "performative deletion" at both grade levels, for example, insertion of it or it went in the blank Zoom! ______!. Children appeared to assume that action implied a performer and they supplied this performer.

Sentences produced by application of "BE deletion" were significantly more difficult than the intact form for second-grade pupils. The absent be was supplied 13 times by pupils in grade two and only twice by those in the first grade. For example, in the test sentence ______ the same old trip in which the correct cloze response was Just, several pupils inserted It's. They appeared to have an implicit understanding that "existence" was involved in the sentence.

Insertion of words affected by deletion transformations was also made on sentences produced by "noun phrase deletion" (15 occurrences). Grade two pupils had performed significantly better on the intact than deleted form corresponding to this transformation rule. However, children varied in the spontaneous errors they made on these test sentences and some omitted the noun phrase (seven occurrences). This suggests that some children expect the noun phrase to be repeated and others expect a coreferential noun phrase to be deleted.

Both insertion and omission of words affected by deletion transformations were made on sentences involving "WH", "preposition" and "(that) + S as object" deletions. There were no significant differences between intact and deleted forms on any of these although differences tended to favor the deleted form. On test sentences for "(that) + S as object", there was an equal number of insertions and omissions (11); on those for "WH deletion", there were six omissions and eight insertions; and on those for "preposition deletion", there were six omissions and 14 insertions.

Differences between intact and deleted forms were also not significant on the "imperative" and spontaneous changes were interesting on this structure. All intact test sentences corresponding to deleted forms involved insertion of you. However, several pupils inserted can as well as you in their response to this structure. There may have been more difference between performance on the intact and deleted forms corresponding to the "imperative deletion" if you can had been assumed in the intact form rather than you.

From the above results, it appears that when children find the intact form for a deletion transformation easier to comprehend, they spontaneously change the deletion produced structure to the intact form as they read. When there is no difference between the intact and deleted forms in cloze performance, children tend to either make very few spontaneous changes or both insert and omit words affected by deletion transformations.

III. TYPE OF ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES

Errors made on the cloze tests were marked in terms of both semantic and grammatical features to get an indication of strategies being used by beginning readers. Grammaticality was considered at the word and sentence levels and semantic acceptability at the word, sentence and passage levels. Significant differences between intact and deleted sentence structures on each of these criteria were determined by t-tests performed on proportion scores. Scores reported in this section have been converted to percentages for clarity and ease of understanding.

Grammatical Acceptability of Errors

Table X shows the percentage of errors falling into each grammatical category for the deleted and intact forms corresponding to each transformation rule.

At the first-grade level, the percentages of errors which were grammatical in terms of the item deleted were similar for the intact and deleted forms. Differences between deleted and intact forms were significant only for the "performative" and "imperative" deletion transformations. In both cases there were significantly more grammatically acceptable errors on the intact form. It appears, therefore, that insertion of words affected by the "imperative" and "performative" deletions assisted pupils in using syntactic strategies when confronted with a cloze task. The proportion of exact replacements was also greater on the intact than deleted forms for these two deletion transformations although these differences were significant only on the "performative".

TABLE X

MEAN PERCENTAGES AND t-TEST RESULTS FOR COMPARISONS OF GRAMMATICALLY ACCEPTABLE ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	GRAMMATICAL IN TERMS OF ITEM				GRAMMATICAL IN TERMS OF CONTEXT				FULLY GRAMMATICAL			
	Grade 1		Grade 2		Grade 1		Grade 2		Grade 1		Grade 2	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	48.0	47.4	53.4	49.8	36.3	38.1	44.9	47.7	33.3	32.6	42.5	42.1
BE deletion	32.1	37.4	38.0	45.1	34.5	35.5	42.6	48.6	27.9	30.4	31.5	37.9
WH + BE	48.8	51.5	53.8	57.4	43.5	51.7*	52.4	52.9	38.2	45.4	47.2	48.0
(That) + S as object	52.5	48.6	63.0	61.0	40.2	33.7	55.0	52.9	32.1	28.7	47.0	46.0
Performative	10.5	28.9**	23.8	20.8	19.3	37.9**	25.8	20.3	10.5	24.4**	23.8	18.2
Imperative	41.5	54.1*	46.7	40.6	43.3	43.5	49.8	42.5	38.2	45.0	41.2	32.8*
Preposition	50.7	50.5	47.6	47.8	41.4	49.7*	49.6	51.1	30.8	36.5	38.9	39.8
Verb Phrase	39.4	43.5	49.3	47.9	42.0	43.4	54.0	57.4	35.5	38.9	44.9	46.0
Noun Phrase	48.0	50.4	50.2	62.9**	48.1	47.2	52.6	65.6**	43.2	43.1	44.5	55.5**
Noun phrase + aux. (verb)	59.0	58.6	47.6	51.3	56.9	48.3	55.3	50.9	48.6	42.8	43.3	42.8
Noun phrase + verb + other	52.7	57.7	53.4	54.8	51.7	54.2	58.6	57.0	44.4	50.3	45.5	45.7
Comparative	52.5	48.6	56.0	55.0	40.2	33.7	42.0	53.0*	36.1	31.7	40.0	44.0
Combined rules	56.4	55.7	56.1	56.2	53.2	51.0	56.8	56.4	45.0	44.0	47.8	47.1

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

intact form of the performative were fully grammatical and at the grade two level, this was true of the "noun phrase deletion".

Although there was little difference in performance on intact and deleted forms, there was considerable difference among structures produced by different transformation rules in the percentage of errors grammatical at the word and context levels. The percentage of errors which was fully grammatical at the first-grade level ranged from 10.5 to 48.6 per cent with an overall mean of 34.9 per cent, and the range was 23.8 to 47.8 per cent at the second-grade level with a mean of 40.9 per cent.

The structures on which fewest errors were grammatically acceptable at the word level involved "performative" and "BE" deletions for pupils in both grades. The "performative" was also a fairly difficult deletion produced structure when number of exact replacements was considered at both grade levels, but "BE deletion" was fairly easy for the grade one sample. Inserting words affected by these deletion transformations increased the number of errors in this category at the first-grade level.

A high number of errors were grammatical at the word level on sentences produced by application of the "noun phrase + auxiliary (verb) deletion", "noun phrase + verb + other elements deletion", and "comparative deletion" at the grade one level, and by the "(that) + S as object", "comparative deletion", and "WH + BE deletion" at the grade two level. Some of these were very difficult in terms of number of exact replacements and others were relatively easy.

When grammaticality was considered in terms of context, relatively few errors on structures produced by "BE", "performative", and "WH" deletions fell into this category at either grade level. Pupils had also made few errors acceptable at the word level on sentences produced by "BE" and "performative" deletions. Pupils in both grades one and two made a relatively large percentage of errors which were grammatical at the sentence level on deletion produced structures involving "noun phrase + auxiliary (verb)" and "noun phrase + verb + other elements" deletions.

Although not always the case, there was a tendency for children to have greater difficulty using their grammatical knowledge when responding to cloze items if the deletion involved a syntactic marker than if redundant contentive material was involved. It is interesting to note as well that more errors made by the pupils in grade one were grammatical at the word than at the sentence level. There was little difference in performance by grade two pupils at these two levels. This suggests that pupils in the grade one sample were operating more at the phrase than sentence level and more specifically were relying heavily on the preceding phrase. Pupils in grade two were able to make more effective use of the total context than those in the first grade.

Semantic Acceptability of Errors

As can be seen from data presented in Table XI, very few errors made by pupils in either grade one or two were semantically acceptable in terms of the item (synonyms). There were only slight differences between percentages of errors in this category on deleted and intact forms although this did reach significance on the "comparative deletion" at the grade two level where there were more synonyms on the intact form.

TABLE XI

MEAN PERCENTAGES AND t-TEST RESULTS FOR COMPARISONS OF SEMANTICALLY ACCEPTABLE ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	SYNONYMS				SEMANTIC AT PASSAGE LEVEL				SEMANTIC AT SENTENCE LEVEL			
	Grade 1		Grade 2		Grade 1		Grade 2		Grade 1		Grade 2	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	0.0	0.0	0.5	1.2	17.0	17.8	23.8	28.9	31.4	32.4	38.3	42.4
BE deletion	3.2	1.9	3.8	4.5	12.5	16.8	22.8	28.3	29.0	29.0	38.9	42.4
WH + BE	0.3	0.5	4.8	2.5	21.8	24.2	31.7	31.8	36.7	42.0	44.9	45.2
(That) + S as object	1.1	1.2	0.0	1.0	19.4	14.6	25.0	22.0	31.9	28.3	50.0	48.0
Performative	0.0	1.2	0.0	0.3	13.6	18.2	17.9	13.8	17.4	33.4**	21.4	19.3
Imperative	0.0	0.0	6.1	3.1	26.8	26.6	26.8	23.2	40.1	45.4	43.9	40.9
Preposition	3.4	2.7	2.9	2.1	23.2	25.0	30.2	29.7	38.2	46.4*	44.7	46.6
Verb phrase	0.9	0.1	1.5	1.2	19.1	15.3	31.7	31.5	37.7	31.6	49.8	49.1
Noun phrase	0.3	1.7	1.8	1.6	21.9	19.8	32.9	42.5**	40.6	36.7	46.7	60.0**
Noun phrase + aux. (verb)	0.9	0.7	0.4	0.0	27.9	24.3	37.5	33.1	52.1	40.0**	51.8	47.7
Noun phrase + verb + other	1.1	0.9	2.4	2.2	28.7	26.8	40.4	32.5	43.2	46.9	51.7	47.9
Comparative	1.9	1.3	1.0	3.0*	20.9	16.3	18.0	32.0**	34.6	26.8	35.0	44.0*
Combined rules	1.5	1.3	2.5	2.5	26.9	24.2*	35.4	33.9	47.0	43.0*	50.8	50.1

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

Considerably more errors were semantically acceptable at the passage than at the word level. There were again only slight differences between intact and deleted forms for most deletion transformation rules although when transformation rules were combined, grade one pupils made more errors in this category on the deleted form. At the grade two level, there were significantly more errors which were semantically acceptable at the passage level on the intact than deleted forms for "noun phrase" and "comparative" deletions. There had also been significantly more grammatically acceptable errors on these deletion produced structures.

At the sentence level, grade one pupils performed differently on different transformation rules. Overall, there were significantly more semantically acceptable errors at the sentence level on deleted than on intact sentence structures. Differences between deleted and intact forms significantly favored the deleted form on sentences involving "noun phrase + auxiliary (verb) deletion". This was the most difficult deletion produced structure when number was considered as well. The opposite trend was evident on several other deletion transformations with differences reaching significance on sentences produced by "performative" and "preposition" deletions. Differences in grammatical acceptability had also significantly favored the intact forms corresponding to "performative" and "preposition" deletions.

Pupils in grade two made a similar number of semantically acceptable errors at the sentence level on intact and deleted forms. There were significantly more errors in this category, however, on intact forms of sentences corresponding to "noun phrase" and "comparative" deletions. Again pupils made more grammatically acceptable errors on the intact forms for these deletion transformation rules.

These results clearly indicate the interrelation of semantic and grammatical cues used by children as they approach a cloze task. The fact that responses could not be considered semantically acceptable unless they were grammatical no doubt contributed to this relationship. However, it is almost certain that beginning readers constantly rely on both their syntactic and semantic knowledge to predict meaning as they read.

As with grammatical acceptability, transformation rules differed in percentage of semantically acceptable errors which occurred at the sentence and passage levels. Pupils obtained few semantically acceptable errors at both the passage and sentence levels on sentences produced by "BE", "performative", and "WH" deletions at the first-grade level, and by "performative", "comparative", and "BE" deletions at the grade two level. This is consistent with findings on grammatical acceptability.

A large percentage of semantically acceptable errors was obtained by the grade one subjects on structures produced by "noun phrase + verb + other elements deletion" and by pupils in both grades one and two on those produced by "noun phrase + auxiliary (verb) deletion". This is again consistent with findings on grammatical acceptability at the sentence level.

Few errors were synonyms but grade two pupils tended to make slightly more errors in this category than pupils in grade one. At the sentence and passage levels, grade two pupils made considerably more semantically acceptable errors. There had also been some difference between grades one and two pupils in percentage of grammatically acceptable errors at the sentence level. Again it appears that grade two pupils are more able to use the wider context to help them understand what they are reading. Grade one pupils do rely on semantic strategies but not to the same extent as pupils in grade two. This is not surprising since first-grade pupils must concentrate a great deal of attention on word identification in any comprehension task including a cloze test. It also confirms the finding that children use larger and larger units of language as they become more proficient readers (Y. Goodman, 1967).

Grammatical and Semantic Acceptability

Data in Tables X and XI suggest that beginning readers in this study tended to rely more heavily on grammatical than semantic cues when confronting both deleted and intact sentence structures. This confirms results obtained by Y. Goodman, 1967.

Results have also suggested an interaction of grammatical and semantic strategies during reading for meaning. When responses were marked in terms of both semantic and grammatical acceptability (Table XII), differences between the intact and deleted sentence structures were minimal. Pupils made significantly more errors in this category on the intact form for the "performative deletion" and pupils in grade two also made significantly more of these errors on the intact form corresponding to the "comparative deletion".

There were more significant differences between intact and deleted forms when responses were marked as unacceptable in terms of both semantic and syntactic categories. When transformation rules were combined, performance on the two forms was similar but there were

TABLE XII

MEAN PERCENTAGES AND t-TEST RESULTS FOR COMPARISONS OF ERRORS GRAMMATICALLY AND SEMANTICALLY ACCEPTABLE OR UNACCEPTABLE ON DELETED AND INTACT SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	SEMANTICALLY OR GRAMMATICALLY UNACCEPTABLE				SEMANTICALLY AND GRAMMATICALLY ACCEPTABLE AT THE PASSAGE LEVEL			
	Grade 1		Grade 2		Grade 1		Grade 2	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	30.9	38.6*	34.4	34.6	22.2	26.0	15.7	19.5
BE deletion	26.5	36.5*	36.7	33.1	12.0	14.4	15.7	19.5
WH + BE deletion	32.3	36.9	33.9	34.6	18.5	19.5	27.0	28.2
(That) + S as object	24.9	36.6**	26.0	31.0	17.8	14.0	23.0	18.0
Performative deletion	33.9	40.2	31.4	42.1**	8.0	15.1*	16.2	12.5
Imperative deletion	37.9	20.8**	24.8	26.8	23.5	17.4	21.6	16.7
Preposition deletion	23.6	28.6	25.2	27.9	15.0	15.7	22.0	22.5
Verb phrase deletion	33.7	36.8	28.4	30.5	13.4	12.3	26.7	25.4
Noun phrase deletion	33.8	27.7	33.5	23.5**	18.4	16.7	27.0	33.1
Noun phrase + auxiliary + (verb) deletion	27.7	30.8	28.4	26.1	22.3	20.4	28.9	25.8
Noun phrase + verb + other elements	32.5	28.2	30.0	30.9	23.1	24.5	30.0	25.1
Comparative deletion	31.4	30.6	40.0	37.0	17.1	15.3	17.0	28.0**
Combined rules	35.3	36.8	34.0	33.8	21.8	20.0	28.9	27.4

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

significant differences when rules were considered independently. Grade one pupils made significantly more unacceptable errors on the intact form of sentences corresponding to "WH", "BE", and "(that) + S as object" deletions. These were among the easiest deletion produced structures when number of exact replacements was considered and insertion of words affected by deletion transformations appeared to result in more unacceptable errors.

First-grade pupils made more unacceptable errors on the deleted than intact form of the "imperative". This was the third most difficult deletion produced structure investigated in this study and insertion of deleted words resulted in a decrease in semantically and grammatically unacceptable errors.

Results were much less clearcut for pupils in grade two. They made significantly more errors on the intact form corresponding to the "performative deletion". Although these pupils had made significantly more exact replacements on the intact form for this transformation rule, insertion of the deleted words did not result in more grammatically and semantically acceptable errors and in fact resulted in more responses which were totally unacceptable. Second-grade subjects also obtained significantly more grammatically and semantically unacceptable errors on sentence structures produced by the "noun phrase deletion". They had made fewer exact replacements on the deleted than the intact form for this transformation rule. Insertion of words affected by the "noun phrase deletion" transformation appeared to interfere with comprehension as measured by cloze test performance for pupils in the second grade.

IV. LOCATION OF EXACT REPLACEMENTS ON DELETED AND INTACT SENTENCE STRUCTURES

Location was considered in terms of two dimensions. The first categorized exact cloze replacements according to whether they occurred preceding the point at which the deletion had or could apply, or following that point. The second involved recording of errors in the matrix string and in the embedded or conjoined string.

Exact Replacements Preceding and Following the Deletion Transformation

Data in Table XIII indicate that pupils in both grades one and two tended to perform similarly on cloze blanks preceding or following the point at which the deletion transformation applies. At the grade one level, however, pupils obtained significantly more exact replacements preceding the point of deletion on the deleted form for the "WH + BE deletion" and on the intact form for the "comparative deletion". These differences reflect overall differences in the number of exact replacements obtained on deleted and intact forms for these transformation rules. First-grade pupils also made more exact replacements on the intact than deleted form corresponding to the "BE deletion" following the point at which the transformation rule applies.

When transformation rules were combined, second-grade subjects made more exact replacements preceding the deletion on deleted than on intact sentence structures. Differences in this direction were also significant on "(that) + S as object". There was a tendency for the opposite trend to occur following the point at which deletion transformations apply. Differences between intact and deleted forms significantly favored the intact form following the point at which

TABLE XIII

MEAN PERCENTAGES AND t-TEST RESULTS FOR COMPARISONS OF EXACT REPLACEMENTS PRECEDING AND FOLLOWING THE DELETION TRANSFORMATION ON INTACT AND DELETED SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	GRADE 1				GRADE 2			
	Preceding		Following		Preceding		Following	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	35.7	31.0	35.5	35.0	44.4	39.9	34.5	38.7
BE deletion	14.7	17.2	32.5	44.9**	13.8	16.3	24.7	31.2
WH + BE deletion	27.6	21.0*	31.5	29.0	33.2	32.0	31.0	28.5
(That) + S as object	18.0	27.4	43.8	39.0	33.0	25.0*	41.0	39.0
Performative deletion	23.5	17.9	0.0	0.0	26.1	27.2	10.0	7.5
Imperative deletion	12.5	0.0	26.0	24.4	14.7	17.8	36.9	37.1
Preposition deletion	38.1	38.8	28.7	27.5	41.7	43.4	37.5	38.4
Verb phrase deletion	35.2	35.3	10.0	17.4	38.5	37.0	6.3	10.6
Noun phrase deletion	36.0	33.7	32.8	30.0	32.9	27.2	30.7	29.2
Noun phrase + auxiliary (verb) deletion	24.2	23.9	17.2	22.2	38.1	36.5	12.4	21.5*
Noun phrase + verb + other elements	37.1	37.9	28.0	24.8	31.5	31.5	14.3	17.5
Comparative deletion	37.2	46.1**	0.8	2.4	13.0	17.0	16.0	35.0**
Combined rules	33.3	33.6	30.9	32.9	37.2	35.0*	33.4	34.1

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

"noun phrase + auxiliary (verb)" and "comparative" deletion transformations apply.

Although there is a tendency for more exact replacements on the deleted form preceding the point of deletion and on the intact form following this point, this factor accounts to only a limited extent for differential responses on intact and deleted forms for most deletion transformation rules.

Informal analysis of the data for deletion produced structures at each grade level comparing the number of exact replacements preceding and following the point of application of the deletion transformation rule revealed that most differences were very small or favored the words in the sentence preceding the deletion. At both grade levels, deletion produced structures involving "performative", "verb phrase", and "noun phrase + verb + other elements" deletions follow this trend as well as those produced by "preposition" and "comparative" deletions for first-grade pupils and "WH" and "noun phrase + auxiliary (verb)" deletions for second graders.

The strongest conclusion which can be drawn from these data is that there is a tendency for deletion of redundant information and to some extent also syntactic markers to adversely affect performance on cloze items directly following the point at which the deletion occurred but that this is certainly not always the case.

Exact Replacements in Matrix and Conjoined/Embedded Sentences

Data presented in Table XIV show the percentages of exact replacements in the matrix and embedded or conjoined sentences for each of the deletion transformations investigated in this study. The test sentences

TABLE XIV

MEAN PERCENTAGES AND t-TEST RESULTS FOR COMPARISONS OF EXACT REPLACEMENTS IN THE MATRIX AND EMBEDDED/CONJOINED STRINGS ON INTACT AND DELETED SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	GRADE 1				GRADE 2			
	Matrix		Conjoined/Embedded		Matrix		Conjoined/Embedded	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	34.3	33.6	26.6	30.7	44.4	42.1	30.2	34.6
BE deletion	31.4	27.1	1.4	37.9**	28.0	31.1	16.7	25.8**
WH + BE deletion	25.7	21.6	33.0	30.0	30.6	33.6	28.4	22.2
(That) + S as object	26.5	33.0	47.4	36.6**	35.0	31.0	41.0	38.0
Performative deletion								
Imperative deletion	55.0	45.0*	15.0	1.6*	29.1	37.8	13.3	25.0*
Preposition deletion								
Verb phrase deletion	34.1	34.1	38.1	41.5	34.4	40.4	34.4	51.2**
Noun phrase deletion	33.9	33.7	30.8	32.2	28.9	24.8	39.4	35.7
Noun phrase + auxiliary (verb) deletion	23.2	23.2	19.2	26.0	28.7	29.5	24.9	37.3**
Noun phrase + verb + other elements	34.9	37.7	31.3	39.9	31.0	31.2	26.1	40.9**
Comparative deletion	32.5	43.0**	36.6	45.0	16.0	35.0**	15.0	30.0**
Combined rules	32.2	33.8	32.8	35.5*	35.0	34.9	35.3	36.3

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

for "preposition" and "performative" deletion transformations could not be categorized on this dimension since these rules never applied to embedded or conjoined strings.

Most differences in number of exact replacements obtained by pupils in grade one on intact and deleted forms were not significant and those which were significant did not reveal any consistent trend. There were significantly more exact replacements in the matrix sentence for the deleted form of the "imperative deletion" and the intact form corresponding to the "comparative deletion". In embedded and conjoined sentences, differences significantly favored the intact form corresponding to the "BE deletion" and the deleted forms of "(that) + S as object" and "imperative" deletions.

At the second-grade level, differences were more clearcut and suggestive of a definite trend. Only one difference was significant in matrix strings and this was on the intact form for the "comparative deletion". Pupils also scored significantly better in the embedded string on the intact form corresponding to the "comparative deletion". They scored better on the intact forms in several other embedded and conjoined strings as well including those for "BE", "imperative", "verb phrase", "noun phrase + auxiliary (verb)", and "noun phrase + verb + other elements" deletions.

It is important to note that deletion transformations applied in all cases to the embedded or conjoined string. The impact of the deletion of words on cloze results was largely restricted to the string to which the deletion transformation was applied and had much less impact on the rest of the sentence.

One can only speculate on why this trend was evident for second graders and not for pupils in grade one. It may be possible, however, that this is a further indication that first-grade pupils operate more at a word or phrase level than at a sentence level and, as suggested by other data in this study, do not make as effective use of their syntactic knowledge of sentences as do pupils in grade two. The reading series being used by pupils in this study had a strong word attack emphasis and this may have encouraged pupils to function at the word level.

V. SUMMARY

Computations of correlation between scores obtained on the experimental cloze tests and the comprehension subtest of a standardized reading achievement test indicated that the cloze was a valid measure of reading comprehension at both the grade one and two levels.

When intact and deleted sentence structures corresponding to each deletion transformation were compared in terms of number of exact replacements, there was a tendency for deletion produced structures to be more difficult than those with words inserted. Differences tended to favor the intact form of those deletion produced structures which were difficult for the pupils in this study. Addition of redundant contentive words appeared to aid comprehension as indicated in performance on the cloze tests more than addition of syntactic markers. When children performed better on the intact form of a deletion transformation than on the deleted form, they tended to spontaneously change the deletion produced structure to its intact form as they read.

Although there were few significant differences between intact and deleted forms in grammatical acceptability, differences which were significant favored the intact form. Few differences between intact and deleted forms were significant in terms of semantic acceptability as well. Some of these differences favored the deleted form and others the intact form. The interrelation of semantic and syntactic cues was clearly demonstrated in the data. Data also indicated that pupils in grade one tend to operate more at the word and phrase level than at the sentence level, and that second-grade pupils tend to rely on sentence context more than those in grade one. Pupils in both grades made more use of grammatical than semantic cues as they read for meaning.

When location of errors was considered, few definite conclusions could be drawn. There was a tendency, however, for application of a deletion transformation to adversely affect cloze test results on material directly following the deletion. Application of deletion transformations also tended to affect performance on words in the embedded or conjoined string to which the rule had applied rather than those in the matrix string.

CHAPTER VIII

FINDINGS: EFFECT OF DELETION PRODUCED STRUCTURES ON WORD IDENTIFICATION

Oral reading tests were administered to provide an indication of the effect of deletion produced structures on the word identification strategies used by beginning readers. Studies of oral reading miscues have suggested that children rely heavily on their syntactic knowledge early in the process of learning to read.

This chapter will discuss the results of the oral reading tests presenting comparisons between intact and deleted forms for each deletion transformation rule in terms of number, type and location of errors. Relative difficulty of each deletion produced structure will also be discussed as will spontaneous corrections and changes.

I. NUMBER OF ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES

Number of errors was tabulated for each deletion transformation first, excluding the words affected by deletion transformations and second, including these words. Scores for each pupil on each sentence were converted to proportions by dividing the number of errors made by the number of words in the sentence. As data in Table XV show, percentages of errors made on deletion produced structures ranged from four to 10 per cent for the first-grade sample with an overall mean of 7.3 per cent. Pupils in grade two made a larger number of errors on sentences produced by application of the "performative deletion" (23 per cent) but on all other deletion produced structures, percentage of errors ranged from four to eight per cent of all words in the test sentences.

TABLE XV

DELETION TRANSFORMATIONS RANKED FROM MOST TO LEAST DIFFICULT IN TERMS OF MEAN PROPORTION OF ORAL READING ERRORS WITH WORDS THAT COULD BE AFFECTED BY DELETION TRANSFORMATIONS CONSIDERED

	GRADE 1		GRADE 2
Mean	Transformation Rule	Mean	Transformation Rule
0.10	Performative deletion Noun phrase + verb + other elements	0.23	Performative deletion
		0.08	BE deletion
0.09	Noun phrase + auxiliary (verb) deletion	0.06	Noun phrase + verb + other elements
0.08	WH deletion WH + BE deletion	0.05	Comparative deletion Noun phrase deletion Preposition deletion
0.07	Imperative deletion Preposition deletion BE deletion	0.04	WH deletion WH + BE deletion (That) + S as object Imperative deletion Verb phrase deletion Noun phrase + auxiliary + (verb) deletion
0.06	(That) + S as object Comparative deletion		
0.05	Noun phrase deletion		
0.04	Verb phrase deletion		

The overall mean percentage of errors was 6.3. There was little difference between grade samples on this variable.

Most authorities in the field of reading define the appropriate instructional reading level as the highest level at which the child makes no more than five uncorrected errors in 100 running words with 75 per cent comprehension (Zintz, 1970). First-grade pupils as a group read with between 90 and 96 per cent accuracy on all test sentences and second-grade pupils with between 92 and 96 per cent accuracy on all test sentences except those produced by "performative deletion". Since the above accuracy scores include both corrected and uncorrected errors, the materials presented for oral reading in this study approached the appropriate instructional level for both grade groups.

Table XVI indicates that the proportion of errors made by first-grade pupils on intact and deleted sentence structures with inserted words considered was the same or only slightly different for most deletion transformations. Proportions were exactly the same for intact and deleted forms corresponding to "BE", "WH + BE", "(that) + S as object", "preposition", and "verb phrase" deletion transformations. Pupils made slightly fewer errors on the intact than deleted form for "WH", "performative", "noun phrase + auxiliary (verb)", and "noun phrase + verb + other elements" deletions, but none of these differences were significant. Insertion of words affected by deletion transformations had improved cloze test results for grade one pupils on sentences involving "performative" and "noun phrase + auxiliary (verb)" deletions. There were more oral reading errors on intact than deleted forms corresponding to "imperative", "noun phrase", and "comparative" deletions, but results were significant only on the "comparative

TABLE XVI

MEANS, STANDARD DEVIATIONS AND t-TEST RESULTS OF COMPARISONS BETWEEN NUMBER OF ORAL READING ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES WITH WORDS THAT COULD BE AFFECTED BY DELETION TRANSFORMATIONS CONSIDERED

	GRADE 1					GRADE 2				
	Deleted		Intact			Deleted		Intact		
Transformation Rule	Mean	Standard Deviation	Mean	Standard Deviation	"t"	Mean	Standard Deviation	Mean	Standard Deviation	"t"
WH deletion	0.08	0.15	0.06	0.11	1.096	0.04	0.08	0.05	0.08	-0.506
BE deletion -	0.07	0.11	0.07	0.12	0.466	0.08	0.17	0.08	0.14	0.060
WH + BE deletion	0.08	0.12	0.08	0.12	0.061	0.04	0.07	0.04	0.06	0.000
(That) + S as object	0.06	0.11	0.06	0.10	0.203	0.04	0.07	0.03	0.05	1.419
Performative	0.10	0.23	0.08	0.16	0.574	0.23	0.41	0.05	0.12	3.815**
Imperative	0.07	0.13	0.08	0.14	-0.379	0.04	0.10	0.03	0.08	0.061
Preposition	0.07	0.12	0.07	0.12	0.398	0.05	0.12	0.05	0.06	0.189
Verb phrase	0.04	0.11	0.04	0.07	0.353	0.04	0.07	0.03	0.06	1.094
Noun phrase	0.05	0.11	0.07	0.11	-1.366	0.05	0.09	0.05	0.08	0.095
Noun phrase + aux. (verb)	0.09	0.15	0.07	0.13	1.135	0.04	0.07	0.06	0.10	-1.592
Noun phrase + verb + other	0.10	0.13	0.08	0.12	0.617	0.06	0.11	0.06	0.08	0.547
Comparative	0.06	0.11	0.10	0.16	-1.780*	0.05	0.09	0.06	0.11	-0.869
Combined rules	0.07	0.07	0.07	0.08	0.126	0.06	0.07	0.05	0.04	3.147**

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

deletion". Insertion of words affected by the "comparative deletion" had helped the first-grade children on the cloze tests but not significantly so. It is evident from these findings that the application of deletion transformations had little effect on the overall number of errors made by pupils in grade one.

Results were similar for the second-grade sample. Proportions of errors made on deleted and intact forms were exactly the same for several deletion transformations, namely "BE", "WH + BE", "preposition", "noun phrase", and "noun phrase + verb + other elements" deletions. Insertion of deleted words had resulted in higher cloze test scores on intact sentence structures corresponding to "BE", "noun phrase", and "noun phrase + verb + other elements" deletion transformations. Pupils in grade two made more errors on the deleted form of sentences produced by "(that) + S as object", "imperative", "performative", and "verb phrase" deletions with differences significant on the "performative deletion". The intact form of the "performative" was significantly easier for pupils in the second grade on the cloze tests and this was true of the "verb phrase deletion" as well. These pupils made slightly more errors on the intact than deleted forms of sentences corresponding to "WH", "noun phrase + auxiliary (verb)", and "comparative" deletion transformation rules. Insertion of deleted words in the "comparative" construction had been a significant aid to performance on the cloze tests but appeared to hinder accuracy of oral reading. As noted in Chapter VII, however, the words inserted were not easy to predict and the errors noted here appeared to be triggered by the relatively unusual appearance of the copula in several of the test sentences. Children in both grades did not appear to expect presence of the copula in comparative sentences and made errors when their expectations were not met.

The above results indicate that the deletion of words by deletion transformations was not a significant factor in the number of oral reading errors made by beginning readers. Deletion of words tended to have much less impact on oral reading accuracy than it had on cloze test results. Pupils in the test sample probably made use of their syntactic knowledge when reading orally and when completing cloze items, but the presence of redundant information appeared to aid comprehension on the cloze tests more than word identification in oral reading. This seems reasonable when the following difference between the two tasks is considered. K. Goodman has noted that when children read orally, they monitor their production by how it sounds; when reading for understanding they monitor their response by whether or not it makes sense. Presence or absence of words which can be optionally deleted affects how a sentence sounds very little except perhaps the unusual appearance of the copula in the comparative. Presence of redundant information appears to help children reduce uncertainty as they read and results in a more accurate prediction of meaning.

Difficulty of Deletion Transformations by Number of Errors

In Table XV the deletion transformations considered in this study are ranked in order of difficulty on the basis of mean proportion of errors with inserted words taken into consideration. There was little difference between transformation rules on this variable although differences were somewhat greater at the grade one than the grade two level, with the exception of the "performative deletion". Second-grade pupils had great difficulty with sentences produced by the "performative deletion" transformation and insertion of deleted words brought the error rate down from 23 to five per cent of the words in the test sentences.

There was some consistency between the two grade groups in those deletion produced structures found to be most difficult. At both grade levels, sentences produced by "performative" and "noun phrase + verb + other elements" deletions were among the three hardest deletion produced structures. Sentences produced by "noun phrase + auxiliary (verb) deletion" were also difficult for first-grade pupils as were those produced by "BE deletion" at the second-grade level.

Grade one pupils had found sentences produced by "noun phrase + auxiliary (verb)" and "performative" deletions to be the two most difficult deletion produced structures on the cloze tests as well. All three of the structures that second-grade children found difficult to read accurately had also been difficult for them to comprehend as indicated by cloze test results. It appears, then, that these structures create problems in both comprehension and word identification which is not surprising since word identification is seen as a prerequisite to meaning at the beginning reading level. Insertion of deleted words, however, tends to aid comprehension more than it does word identification.

Deletion produced structures which were relatively easy to read orally were to a large extent the same as those which had been easy on the cloze tests for both grade groups. First-grade pupils found sentences produced by "noun phrase", "comparative", and "(that) + S as object" deletions relatively easy and second-grade pupils performed well on "WH", "(that) + S as object", "verb phrase", "WH + BE", "imperative", and "noun phrase + auxiliary (verb)" deletion produced structures.

Spontaneous Corrections in Relation to Number of Errors

Table XVII shows the proportion of errors which were spontaneously corrected on deleted and intact sentence structures for each transformation rule and both grade samples. There was a range among transformation rules of one to 10 per cent of all errors corrected.

At the first-grade level, most differences between intact and deleted forms favored the intact form with significantly more spontaneous corrections on the intact forms of sentences involving "preposition", "noun phrase", "verb phrase", and "noun phrase + verb + other elements" deletion transformation rules. Hence, although children made as many errors on intact as on deleted forms, more of these errors were corrected when words affected by deletion transformations were inserted.

At the second-grade level, none of the differences between intact and deleted forms were significant and there was no trend evident in the direction of these insignificant differences.

Spontaneous Changes to the Deleted and Intact Forms

Several researchers, most notably Beaver (1968), noted that oral reading miscues tended to reveal simpler or earlier transformational structures. For example, Beaver found that students repeated parts of coordinations which had been deleted and supplied the deleted relative, the deleted marker _to_, deleted objects etc. His population ranged from grades one to nine and he did not indicate whether this trend was

TABLE XVII

MEAN PROPORTIONS AND t-TEST RESULTS FOR COMPARISONS OF SPONTANEOUS CORRECTIONS ON DELETED AND INTACT SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	GRADE 1		GRADE 2	
	Deleted	Intact	Deleted	Intact
WH deletion	0.06	0.06	0.10	0.06
BE deletion	0.06	0.11	0.08	0.10
WH + BE deletion	0.09	0.06	0.10	0.07
(That) + S as object	0.09	0.07	0.07	0.05
Performative deletion	0.07	0.06	0.01	0.05
Imperative deletion	0.07	0.07	0.04	0.06
Preposition deletion	0.02	0.09*	0.07	0.14
Verb phrase deletion	0.01	0.09**	0.06	0.09
Noun phrase deletion	0.07	0.19*	0.05	0.05
Noun phrase + auxiliary (verb) deletion	0.10	0.12	0.04	0.06
Noun phrase + verb + other elements	0.07	0.14*	0.10	0.07
Comparative deletion	0.09	0.14	0.08	0.05

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

evident at all levels.

In this study pupils both inserted words which had been omitted by deletion transformations and omitted words inserted in the intact sentence forms. Their omissions involved three syntactic markers and these changes were particularly prevalent at the second-grade level. The syntactic markers were that in the object complement (five occurrences), to in the infinitival complement construction (14 occurrences), and relative pronouns (five occurrences). The only syntactic marker to be inserted was the infinitival complement marker to and pupils inserted this marker less frequently than they had omitted it. There was also a tendency for pupils at both grade levels to omit noun phrases particularly when these involved a pronoun (11 occurrences). All of these structures which involved changes to the deleted form were read with relatively good accuracy especially by the second-grade children.

The only test structure which involved a relatively large number of changes to the intact form were those produced by "BE deletion". These changes occurred for both grade groups but more frequently at the second-grade level. There were also a number of instances of insertion of all or some words affected by the "noun phrase + verb + other elements deletion" and the "noun phrase + auxiliary (verb) deletion' transformation rules. Sentences produced by application of "BE deletion" were relatively difficult for the second-grade pupi[illegible]ut of average difficulty for pupils in grade one. Structures produced by the "noun phrase + verb + other elements deletion", however, were one of the most difficult deletion produced structures for first-grade pupils.

It is important to note that in relation to the total number of pupils in the test sample, occurrences of either insertions or omissions were relatively rare. It is interesting, as well, that some children made more than one of the above mentioned changes and preference for a deleted or intact form may be to some extent idiosyncratic. It is clear, however, that changes involving words affected by deletion transformations did not, as Beaver (1968) found, tend to involve transformation reduction. In fact, the opposite trend was evident.

II. TYPE OF ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES

As on cloze tests, all oral reading errors were marked according to grammatical and semantic acceptability. Substitutions were marked in terms of grammaticality at the word and sentence levels and semantic acceptability at the word, sentence and passage levels. Additions, omissions and transpositions were marked in terms of grammatical and semantic acceptability in context.

Grammatical Acceptability of Oral Reading Errors

Data are presented in Table XVIII to show the relative proportion of grammatically acceptable errors on deleted and intact forms for pupils in each of grades one and two. Grade one pupils obtained more grammatically acceptable errors at the word level on the intact than deleted forms for several deletion transformation rules and these differences were significant on those involving the "performative" and "noun phrase" deletions. These pupils had also obtained more errors in this category on cloze test sentences involving the "performative". On other test structures, however, differences while not significant favored the deleted form.

TABLE XVIII

MEAN PROPORTIONS AND t-TEST RESULTS FOR COMPARISONS OF GRAMMATICALLY ACCEPTABLE ORAL READING ERRORS ON INTACT AND DELETED SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	GRAMMATICAL IN TERMS OF THE ITEM				GRAMMATICAL IN TERMS OF CONTEXT			
	Grade 1		Grade 2		Grade 1		Grade 2	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	0.26	0.22	0.23	0.31	0.19	0.11	0.20	0.29
BE deletion	0.17	0.16	0.11	0.06	0.17	0.13	0.16	0.16
WH + BE deletion	0.21	0.21	0.12	0.16	0.19	0.23	0.17	0.20
(That) + S as object	0.22	0.19	0.17	0.15	0.15	0.11	0.23	0.21
Performative deletion	0.05	0.13*	0.14	0.11	0.10	0.16	0.14	0.16
Imperative deletion	0.15	0.18	0.08	0.16	0.12	0.16	0.06	0.16*
Preposition deletion	0.17	0.25	0.12	0.17	0.22	0.26	0.15	0.28*
Verb phrase deletion	0.14	0.16	0.13	0.14	0.16	0.19	0.23	0.17
Noun phrase deletion	0.15	0.27*	0.16	0.25	0.06	0.20**	0.16	0.28*
Noun phrase + auxiliary (verb) deletion	0.19	0.15	0.17	0.13	0.12	0.14	0.20	0.19
Noun phrase + verb + other elements	0.26	0.34	0.14	0.23	0.22	0.32	0.10	0.24**
Comparative deletion	0.24	0.31	0.16	0.17	0.16	0.16	0.11	0.14
Combined rules	0.43	0.45	0.44	0.41	0.38	0.38	0.42	0.49

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

Second-grade children also tended to obtain more errors which were grammatically acceptable in terms of the item on intact than deleted sentence structures but none of these differences reached significance and again there were some instances of slightly higher scores on deleted than intact forms.

When sentence context was taken into account, there was again a tendency for more grammatically acceptable errors to be made on sentences with words affected by deletion transformations inserted. At the first-grade level, differences were significant on sentences corresponding to the "noun phrase deletion" and at the second-grade level on those for "imperative", "preposition", "noun phrase", and "noun phrase + verb + other elements" deletions. It appears, then, that insertion of both contentives and syntactic markers helped pupils apply syntactic strategies to word identification when reading orally, but that this was not great enough to result in an overall increase in the number of words correctly identified.

There was little difference between grade groups in the proportions of errors which were grammatical at the sentence level. Second-grade pupils had made greater use of syntactic sentence knowledge than grade one children when confronted with a cloze test. Both groups made use of this knowledge when reading orally. There was also little difference in proportions of errors grammatical at the word and at the sentence levels for the grade two sample. However, first-grade pupils tended to make more errors which were grammatical in terms of the item than the sentence again suggesting dependence on syntactic cues at the word and phrase level. They also made more errors which were in the same grammatical category as the expected response than did second graders.

There were differences among different deletion produced structures in proportions of errors which were grammatically acceptable, but little consistency between grade samples in those transformation rules with the greatest or least number of errors in the grammatical categories. Few errors were grammatical at the word level on sentences produced by the "performative" and "verb phrase" deletions at the first-grade level and by the "imperative" and "preposition" deletions at the second-grade level. A relatively large number of errors fell into this category on "WH" and "noun phrase + verb + other elements" deletions for first-grade children and on "WH" and "noun phrase" deletions for those in the second grade.

When sentence context was considered, few errors made by grade one pupils were grammatically acceptable on sentences produced by "noun phrase" and "performative" deletions and few by pupils in grade two on "imperative" and "noun phrase + verb + other elements" deletions. On the other hand, a relatively large number of errors were of this type on "noun phrase + verb + other elements" and "preposition" deletions for first-grade pupils and on "(that) + S as object" and "verb phrase deletion" for those in the second grade. Some of the above structures were very difficult when number of errors was considered and others were relatively easy. There does not appear to be an exact relationship between the number of errors made and the number of these errors which were grammatically acceptable. This is not surprising since the factor manipulated in this study was syntactic in nature and could be expected to influence the use of grammatical cues more than any others.

Semantic Acceptability of Oral Reading Errors

As shown in Table XIX very few oral reading errors made by pupils in this study could be classified as semantically acceptable at the word level (synonyms). The proportion of errors semantically acceptable at the passage level ranged from 0.02 to 0.16 for pupils in grade one and from 0.01 to 0.15 for pupils in grade two. There was very little overall difference between grade groups on this variable.

First-grade pupils obtained more errors which were semantically acceptable at the passage level on intact than deleted sentence structures for four deletion transformations, more on deleted than intact sentences for four other deletion transformations and an identical number for the four remaining. Only one difference was significant with more semantically acceptable errors on the intact than deleted form corresponding to the "noun phrase deletion". These pupils had also made more grammatically acceptable errors at the sentence level on the intact form of this deletion transformation.

Results were more clearcut at the second-grade level with more semantically acceptable errors on intact than deleted forms for most deletion transformations. Grade two pupils had also obtained more grammatically acceptable errors (in context) on these transformation rules. On the cloze tests, differences in number of semantically acceptable errors significantly favored the intact forms for "noun phrase" and "comparative" deletions. It is extremely difficult to separate the influence of semantic and syntactic cues as has been pointed out by several researchers and one can only assume that pupils in this study integrated semantic and syntactic cues when identifying words on these test sentences. It is apparent, however, that a larger

TABLE XIX

MEAN PROPORTIONS AND t-TEST RESULTS FOR COMPARISONS OF SEMANTICALLY ACCEPTABLE ORAL READING ERRORS ON INTACT AND DELETED SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	SEMANTIC AT WORD LEVEL				SEMANTIC AT PASSAGE LEVEL				SEMANTIC AT SENTENCE LEVEL			
	Grade 1		Grade 2		Grade 1		Grade 2		Grade 1		Grade 2	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion			0.02	0.02	0.09	0.04	0.11	0.19	0.14	0.08	0.14	0.21
BE deletion					0.07	0.07	0.06	0.11	0.10	0.09	0.08	0.12
WH + BE					0.08	0.10	0.15	0.16	0.15	0.17	0.16	0.19
(That) + S as object			0.02	0.01	0.11	0.06	0.14	0.09	0.14	0.08	0.20	0.16
Performative			0.10	0.05	0.07	0.09	0.14	0.12	0.10	0.12	0.14	0.13
Imperative					0.06	0.06	0.01	0.04	0.10	0.15	0.05	0.16*
Preposition			0.01	0.01	0.16	0.16	0.11	0.21*	0.22	0.26	0.12	0.25*
Verb phrase					0.08	0.06	0.12	0.10	0.12	0.14	0.20	0.14
Noun phrase			0.01	0.02	0.02	0.09*	0.09	0.19**	0.04	0.16**	0.13	0.22*
Noun phrase + aux. (verb)					0.05	0.05	0.07	0.10	0.11	0.11	0.15	0.12
Noun phrase + verb + other	0.04	0.01			0.13	0.19	0.06	0.19**	0.19	0.28*	0.07	0.21**
Comparative			0.01	0.02	0.09	0.05	0.06	0.10	0.15	0.13	0.08	0.13
Combined rules	0.02	0.01	0.05	0.06	0.21	0.19	0.26	0.35**	0.33	0.32	0.35	0.42*

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

proportion of errors was grammatically than semantically acceptable suggesting that syntactic cues may have been paramount.

When semantic acceptability was considered at the sentence level, pupils in both grades obtained higher proportions of acceptable errors than they had at the passage level. There was little difference between grade groups on this variable. The proportions of semantically acceptable errors at this level were similar to those obtained for grammatical acceptability at the sentence level. However, more errors were semantically acceptable at the sentence level on the cloze than oral reading tests.

Grade one subjects made somewhat more errors semantically acceptable at the sentence level on the intact forms corresponding to "WH + BE", "performative", "imperative", "preposition", "noun phrase", "verb phrase", and "noun phrase + verb + other elements" deletions than they did on deleted forms with differences significant on the "noun phrase" and "noun phrase + verb + other elements" deletion transformations. Words inserted in intact forms for these two transformation rules were contentives and the first-grade pupils in this study seemed able to make use of this redundant semantic information in the identification of words. For the remaining five deletion transformations, there were either no differences between intact and deleted forms or these differences favored the deleted form.

Second-grade pupils also obtained more semantically acceptable (sentence level) errors on the intact forms corresponding to most deletion transformations with differences significant on "imperative", "preposition", "noun phrase", and "noun phrase + verb + other elements" deletions. There was almost complete overlap between transformation rules on which differences between intact and deleted forms on grammatical and semantic acceptability of errors were significant again illustrating the integration of the two cue systems.

There were only minor differences between different deletion produced structures in proportion of semantically acceptable errors at either the passage or the sentence levels. The two structures on which first-grade pupils made most semantically acceptable errors at both levels were those produced by "preposition" and "noun phrase + verb + other elements" deletions. At the second-grade level, most errors in these categories were made on "WH + BE" and "(that) + S as object" deletions. Relatively small proportions of errors semantically acceptable were obtained by grade one children on "noun phrase deletions" and by second-grade children on the "imperative deletion". There was little consistency between grades when transformation rules were ranked on semantic acceptability of errors.

III. LOCATION OF ERRORS ON DELETED AND INTACT SENTENCE STRUCTURES

All oral reading errors were considered on the same location dimensions as exact replacements had been on the cloze tests.

Errors Preceding and Following the Deletion Transformation

Data in Table XX indicate that the proportion of errors preceding the point at which the deletion transformations apply was similar on intact and deleted forms for all transformations except the "comparative deletion". On this deletion produced structure, there were significantly more errors on the intact than deleted sentence structures. This was also found for grade one pupils on the cloze tests. Proportions of errors obtained by second-grade pupils on this variable were

TABLE XX

MEAN PROPORTIONS AND t-TEST RESULTS FOR COMPARISONS OF ERRORS PRECEDING OR FOLLOWING THE DELETION TRANSFORMATION ON INTACT AND DELETED SENTENCE STRUCTURES FOR EACH TRANSFORMATION AT EACH GRADE LEVEL

Transformation Rule	GRADE 1				GRADE 2			
	Preceding		Following		Preceding		Following	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	0.08	0.06	0.10	0.05	0.05	0.04	0.04	0.04
BE deletion	0.03	0.05	0.07	0.06	0.02	0.02	0.08	0.07
WH + BE deletion	0.09	0.07	0.08	0.07	0.03	0.03	0.08	0.04
(That) + S as object	0.04	0.08	0.08	0.06	0.03	0.02	0.05	0.04
Performative deletion	0.10	0.10			0.10	0.07	0.01	0.00
Imperative deletion			0.07	0.10	0.00	0.01	0.03	0.02
Preposition deletion	0.06	0.04	0.09	0.08	0.04	0.05	0.05	0.03
Verb phrase deletion	0.04	0.04	0.02	0.02	0.04	0.04		
Noun phrase deletion	0.06	0.08	0.04	0.04	0.05	0.04	0.04	0.04
Noun phrase + auxiliary + (verb) deletion	0.07	0.07	0.12	0.05*	0.04	0.06*	0.05	0.08
Noun phrase + verb + other elements	0.09	0.08	0.09	0.09	0.05	0.07	0.08	0.04
Comparative deletion	0.05	0.09*			0.05	0.06	0.00	0.01
Combined rules	0.06	0.07	0.08	0.07	0.05	0.05	0.06	0.04*

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

also similar on intact and deleted forms although there were significantly more errors on the intact form for the "noun phrase + auxiliary (verb) deletion".

When words following the point at which the deletion transformations apply were considered, proportions of errors for pupils in both grades were similar although there was a tendency for more errors to occur in the deleted form. This was significant for grade one pupils on the "noun phrase + auxiliary (verb) deletion".

As on the cloze tests, there was a slight tendency for more errors to be made on intact than deleted sentence structures when words preceding the point of deletion were considered and more errors on the deleted form when words following this point were taken into account. This tendency could not be generalized to all deletion transformations investigated in this study and although application of a deletion transformation appeared to hinder oral reading of words directly following it to a limited extent, this factor was of minimal significance in differentiating deleted and intact forms.

Errors in the Matrix and Conjoined or Embedded Sentences

As noted in the findings section on comprehension, deletion transformations affected words in the conjoined or embedded sentences rather than those in the matrix.

First-grade pupils tended to either make a similar number of errors in the matrix sentence on intact and deleted forms or slightly more on the intact form (Table XXI). They made significantly more errors on the intact form of the comparative. There were no significant differences between scores made by grade two pupils on deleted or

TABLE XXI

MEAN PROPORTIONS AND t-TEST RESULTS FOR COMPARISONS OF ERRORS IN THE MATRIX AND EMBEDDED OR CONJOINED STRINGS IN DELETED AND INTACT SENTENCE STRUCTURES FOR EACH TRANSFORMATION RULE AT EACH GRADE LEVEL

Transformation Rule	GRADE 1				GRADE 2			
	Matrix		Conjoined/Embedded		Matrix		Conjoined/Embedded	
	Deleted	Intact	Deleted	Intact	Deleted	Intact	Deleted	Intact
WH deletion	0.07	0.06	0.09	0.05	0.04	0.04	0.05	0.06
BE deletion	0.01	0.02	0.03	0.04	0.03	0.03	0.04	0.04
WH + BE deletion	0.08	0.11	0.09	0.05	0.03	0.03	0.06	0.04
(That) + S as object	0.04	0.07	0.07	0.07	0.03	0.02	0.05	0.04
Performative deletion								
Imperative deletion	0.03	0.03	0.05	0.05			0.01	0.02
Preposition deletion								
Verb phrase deletion	0.04	0.04	0.04	0.05	0.04	0.03	0.06	0.04
Noun phrase deletion	0.05	0.07	0.05	0.08	0.04	0.04	0.05	0.05
Noun phrase + auxiliary (verb) deletion	0.08	0.08	0.10	0.06*	0.04	0.06	0.05	0.06
Noun phrase + verb + other elements	0.11	0.10	0.08	0.07	0.05	0.06	0.08	0.05
Comparative deletion	0.05	0.10*	0.04	0.09*	0.06	0.05	0.04	0.08*
Combined rules	0.07	0.08	0.08	0.07	0.05	0.05	0.05	0.06

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

intact forms in the matrix string corresponding to any deletion transformation rule investigated in this study.

In conjoined or embedded strings, first- and second-grade pupils again obtained similar proportions of errors on deleted and intact sentence structures. Both grade groups made significantly more errors on the intact form of the comparative and pupils in grade one made more on the deleted form of the "noun phrase + verb + other elements deletion" transformation. There had been no definite trend apparent on this variable for first-grade pupils on the cloze tests but second-grade pupils had tended to make more exact replacements on the intact than deleted form of conjoined or embedded strings. This was not a significant factor in identification of words when reading orally; difficulty or ease involved the entire sentence rather than a specific string in the sentence.

IV. SUMMARY

When number of oral reading errors made by the beginning readers in this study was considered, there were few significant differences between intact and deleted sentence structures and the conclusion was drawn that the deletion of words by an optional transformation did not appear to be a significant factor in oral identification of words at the beginning stage of reading. Deletion of words tended to have much more effect on cloze test results than on oral reading.

On the cloze tests, there had been considerable difference between deletion produced structures in number of exact replacements obtained. Differences in performance on different deletion produced structures were less apparent when pupils were required to read orally.

In general, however, deletion produced structures which were easy to read orally were also those on which pupils had obtained high cloze scores, and those which caused problems on oral reading were also difficult on the cloze tests. Children in the first grade tended to spontaneously correct more errors on intact than deleted sentence structures, but children in grade two did not differentiate between intact and deleted forms on this variable. Several spontaneous changes in grammatical structure involved changes of intact sentences to the deleted form. On the cloze tests, most spontaneous changes had been from the deleted to the intact form, particularly when difficult deletion produced structures were involved.

When grammaticality of errors was considered, there were few significant differences in performance on intact and deleted sentence structures although, as on the cloze tests, there was a tendency for more errors in this category to be made on the intact form. This was also the case when semantic acceptability of errors was considered. Grade one children appeared to be able to more effectively use sentence context when reading orally than when completing cloze blanks. Although both grade groups integrated semantic and syntactic strategies as they read, they tended to make more use of grammatical than semantic cues on both the cloze and oral reading tests.

Location of errors was a much less significant factor in oral reading than it had been on the cloze test results, although there was some tendency for the deletion of words to hinder the identification of words directly following the missing words.

From these results it appeared that the application of deletion transformations was a more significant factor in comprehension than word identification, and it has been suggested that a sentence "sounds" acceptable whether or not an optional deletion transformation has been applied, but that the insertion of redundant information helps beginning readers to predict meaning.

CHAPTER IX

RECOVERABILITY AND SELECTED BIAS VARIABLES

Although the present study did not assume the psychological reality of transformational grammar, two tests were administered to determine if a psychological correlate of Chomsky's notion of linguistic recoverability was apparent. The first test, which required subjects to spontaneously provide deleted words, was particularly consistent with the view of comprehension taken in this study, namely comprehension as a predictive, constructive process. The second test, a multiple choice test, required pupils to choose the intact paraphrase of deletion produced structures. This chapter will present findings obtained on these tests.

In addition three bias variables, reading achievement, chronological age, and sex, will be considered and correlations of these with selected criterion variables will be reported.

I. RESULTS OF RECOVERABILITY TESTS

Tables XXII and XXIII clearly indicate that the cloze recoverability test was much more difficult than the multiple choice test. The mean scores obtained on the cloze recoverability test by grade one and two pupils respectively were 18.4 and 26.2 per cent. On the multiple choice test, 71.3 per cent of all items were correctly answered by pupils in grade one and 72.9 per cent by second graders. Some of the difference in percentage scores obtained on these two tasks can be accounted for by the fact that subjects could have scored 30 per cent on the multiple choice test by chance alone since there were only

TABLE XXII

TRANSFORMATION RULES RANKED ON THE BASIS OF MEAN PERCENTAGE SCORES ON THE MULTIPLE CHOICE RECOVERABILITY TESTS

Mean	GRADE 1 Transformation Rule	Mean	GRADE 2 Transformation Rule
83.7	Noun phrase deletion	86.2	Performative deletion
80.0	Verb phrase deletion	85.0	Noun phrase + aux. (verb) deletion
78.7	Preposition deletion	83.7	Noun phrase deletion
77.5	WH deletion	80.0	Verb phrase deletion
75.0	Noun phrase + verb + other elements	78.7	WH deletion
73.7	Performative deletion	72.5	(That) + S as object
70.0	WH + BE deletion	67.5	Noun phrase + verb + other elements Preposition deletion
68.8	Comparative deletion		
66.2	BE deletion	66.7	BE deletion
65.0	(That) + S as Object	66.2	Imperative deletion Comparative deletion
61.2	Noun phrase + aux. (verb) deletion	55.0	WH + BE deletion
56.3	Imperative deletion		

TABLE XXIII

TRANSFORMATION RULES RANKED ON THE BASIS OF MEAN PERCENTAGE SCORES ON THE CLOZE RECOVERABILITY TESTS

Mean	GRADE 1 Transformation Rule	Mean	GRADE 2 Transformation Rule
33.7	Performative deletion	46.2	WH deletion
31.3	WH deletion		Verb phrase deletion
	(That) + S as Object	42.5	(That) + S as Object
30.0	BE deletion	33.7	Performative deletion
26.2	Noun phrase deletion		BE deletion
18.8	Verb phrase deletion	21.2	Imperative deletion
17.5	Comparative deletion		Noun phrase deletion
10.0	Preposition deletion		Noun phrase + auxiliary (verb) deletion
	Noun phrase + auxiliary (verb) deletion	18.8	Noun phrase + verb + other elements
7.5	Imperative deletion	15.0	Preposition deletion
	WH + BE deletion	7.5	WH + BE deletion
3.7	Noun phrase + verb + other elements		Comparative deletion

three alternative sentences to choose from. The chance factor was operating to a much lesser extent on the cloze recoverability tests. Two other factors noted in discussion of the pilot study appeared to lower scores on the cloze recoverability task. Pupils were not told how many words to insert in each blank and had difficulty determining how much was required. The test sentences were grammatically and semantically acceptable without inserting any words and as this study has suggested, pupils do not tend to change sentences which are consistent with their linguistic knowledge. It does appear, however, that while pupils are able to indicate that intact and deleted forms have the same meaning, they find it difficult to predict deleted words in deletion produced structures. This suggests that the beginning readers in this study treated deleted and intact sentence structures as equivalence class sets but had real difficulty predicting or "recovering" deleted words spontaneously.

Although all percentage scores obtained on the multiple choice recoverability test exceeded the chance level, there was considerable range in scores obtained on the 12 different transformation rules included in this study. At the first-grade level, scores ranged from 56.3 to 83.7 per cent and at the second-grade level from 55.0 to 86.2 per cent.

When transformation rules were ranked on the basis of these recoverability scores, there was consistency between grade groups on some transformation rules in terms of relative difficulty. Intact and deleted forms corresponding to "noun phrase" and "verb phrase" deletions tended to be easy on the multiple choice recoverability test whereas those for "imperative" and "BE" deletions tended to be difficult.

On the cloze recoverability tests, scores obtained by pupils in grade one ranged from 3.7 to 33.7 per cent correct and for pupils in grade two from 7.5 to 46.2 per cent. Again the rank order of transformation rules obtained by the two grade groups on this variable was somewhat similar. Sentences derived by "WH", "(that) + S as object", and "performative" deletions were easy for both grades one and two pupils and "WH + BE", "preposition", and "noun phrase + verb + other elements" deletions were difficult.

Scores obtained on both the multiple choice and cloze recoverability tests were significantly related to cloze results on deleted and intact sentence structures as shown in Table XXIV. The difference in cloze scores obtained on deleted and intact forms was not significantly related to recoverability, although correlations of recoverability scores were slightly higher with deleted than with intact forms. It was concluded, therefore, that recoverability was of little significance in differential comprehension of intact and deleted sentence structures. Instead, recoverability appears to be a more general factor closely related to overall reading comprehension. The recoverability tests were presented orally but there appeared to be a general comprehension factor involved in both the oral and written language situations. No claim is made, however, that comprehension and recoverability are equivalent terms (Simons, 1971).

The number of oral reading errors made by first-grade pupils on deleted and intact sentence structures was not significantly related to recoverability scores on either the multiple choice or cloze tests. At the second-grade level, however, scores for full and truncated

TABLE XXIV

CORRELATIONS OF RECOVERABILITY SCORES WITH SELECTED CRITERION VARIABLES

Variable	GRADE 1 Cloze Recoverability Truncated	Full	Total	Multiple Choice Recoverability	GRADE 2 Cloze Recoverability Truncated	Full	Total	Multiple Choice Recoverability
Number of correct cloze items (deleted)	.011	.267**	.347**	.299**	.198**	.265**	.334**	.314**
Number of correct cloze items (intact)	.025	.229**	.334**	.258**	.213**	.248**	.297**	.302**
Number of correct cloze items (intact minus deleted)	.042	-.058	.030	-.070	.005	-.042	-.054	-.040
Number of oral reading errors (deleted)	.010	.044	.028	.034	-.158*	-.170*	-.139	-.201**
Number of oral reading errors (intact)	-.023	-.005	.003	-.004	-.050	-.051	-.017	-.038

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

recoverability on the cloze tests and on the multiple choice test were significantly related to the number of oral reading errors made on deleted sentence structures but not on the corresponding intact forms. More oral reading errors were made on deletion produced structures which were found difficult on the recoverability tests. Structures which were easy to recover were also easy to read orally.

II. RELATIONSHIP OF READING ACHIEVEMENT TO SELECTED VARIABLES

Reading achievement was measured by the Gates-MacGinitie Reading Tests. Chronological age was significantly related to scores obtained on this test by first-grade pupils, with older pupils performing better than their younger counterparts. Chronological age was not a significant factor in reading achievement at the second-grade level (Table XXV).

In correlations involving sexual status, minus scores indicate that girls obtained more responses in a particular category than the boys. As can be seen from Table XXV, second-grade girls obtained significantly higher reading achievement scores than did the boys. Sex was not significantly related to reading achievement at the first-grade level.

Scores obtained on the Gates-MacGinitie Reading Tests were significantly related to number of correct cloze responses on intact and deleted sentence structures at both grade levels. This is not surprising since the consideration of validity in Chapter VII had indicated a high relationship between total cloze scores and reading comprehension scores on the Gates-MacGinitie tests. Reading achievement was not related, however, to differences in cloze scores on

TABLE XXV

CORRELATIONS OF READING ACHIEVEMENT WITH SELECTED VARIABLES

	GRADE 1			GRADE 2		
Variable	Vocabulary	Comprehension	Total	Vocabulary	Comprehension	Total
Chronological age	.194**	.165*	.184*	.029	.036	-.013
Sex	.006	-.059	-.033	-.188*	-.306**	-.258**
Correct cloze responses on deleted	.698**	.699**	.728**	.585**	.521**	.484**
Correct cloze responses on intact	.765**	.763**	.795**	.597**	.498**	.491**
Correct cloze responses (intact minus deleted)	.036	.030	.033	.010	.062	.011
Oral reading errors on deleted	-.096	-.141	-.127	-.435**	-.393**	-.479**
Oral reading errors on intact	.050	-.058	-.003	-.131	-.069	-.190*
Multiple choice recoverability	.381**	.381**	.396**	.198**	.293**	.152
Cloze recoverability	.290**	.283**	.299**	.205**	.258**	.273**

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

deleted and intact sentence structures.

Reading achievement on the standardized reading test was not related to the number of oral reading errors made by first-grade pupils on deleted or intact sentence structures. In other words, good and poor readers as rated by the standardized reading test performed similarly on the oral reading tests. At the second-grade level, however, the number of oral reading errors obtained on deletion produced structures was significantly related to all reading achievement scores and on intact sentence structures to total reading achievement. It appears, then, that good second-grade readers performed better than poor readers on sentences containing deletion produced structures but this trend was not as obvious on intact sentences. Hence, it is likely that the presence of deletion produced structures in primary reading materials hinders word identification in oral reading more for poor than for good readers.

It is somewhat surprising that there was not a closer relationship between overall reading achievement and oral reading errors since word identification is considered as a prerequisite for comprehension at the beginning reading stage. This is probably largely due to the fact that a control for differential word recognition ability was built into the oral reading test results by eliminating all words not identified in isolation from consideration. There is little doubt as well, however, that the requirement of comprehension adds a second facet to the task and that adequate word identification does not ensure comprehension.

Reading achievement was significantly related to recoverability scores obtained on both the multiple choice and cloze formats. As noted previously, the recoverability tests appeared to be measuring a general comprehension factor and meaning was involved on both the vocabulary and comprehension subtests of the Gates-MacGinitie tests.

III. RELATIONSHIP OF CHRONOLOGICAL AGE AND SEX TO SELECTED VARIABLES

Chronological age was not significantly related to the number of exact cloze replacements, number of oral reading errors or recoverability scores obtained by pupils in the second grade and significantly related only to performance on the total cloze tests and cloze results on intact sentence structures for those in grade one. Older pupils performed somewhat better than those younger on these two variables (Table XXVI).

The sexual status of first-grade pupils was not significantly related to performance on the cloze, oral reading and recoverability tests although at the second-grade level, girls obtained significantly more cloze responses across all test sentences and on intact and deleted sentence structures. This reflects the general superiority in comprehension abilities of grade two girls in this study and this superiority in comprehension was also evident on the multiple choice recoverability test.

IV. SUMMARY

The cloze recoverability tests were considerably more difficult than the corresponding multiple choice format. This suggests that deleted and intact sentence structures were treated as equivalence class sets but that spontaneous recovery of deleted words was a difficult task. Scores obtained on both recoverability tests were

TABLE XXVI

CORRELATIONS OF CHRONOLOGICAL AGE AND SEX WITH SELECTED VARIABLES

	GRADE 1		GRADE 2	
Variable	Chronological Age	Sex	Chronological Age	Sex
Total cloze score	.173*	-.002	-.003	-.294**
Correct cloze responses on deleted	.090	-.035	.017	-.210**
Correct cloze responses on intact	.155*	-.035	.013	-.177*
Oral reading errors on deleted	-.073	.091	-.073	.067
Oral reading errors on intact	-.028	.067	-.007	.008
Multiple choice recoverability	.144	-.109	-.005	-.187*
Cloze recoverability	.044	-.023	-.016	-.105

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence

significantly related to cloze scores on deleted and intact sentence structures, and recoverability appeared to be a general comprehension factor which did not account for differential performance on the two grammatical forms.

Number of oral reading errors and recoverability scores were not significantly related at the first-grade level, but there was a significant relationship between performance on deletion produced structures and recoverability when the second-grade sample was considered.

Older pupils in grade one scored better than younger pupils on the standardized reading test, and second-grade girls obtained higher scores than the boys. Reading achievement as measured by the standardized reading tests was significantly related to cloze test results on deleted and intact sentence structures but not differences in performance on these two forms. The proportion of errors made by first-grade pupils on oral reading passages was not significantly related to reading achievement, but this relationship was significant for second-grade subjects. The presence of deletion produced structures appeared to negatively affect the oral reading of poor readers more than good readers at the second-grade level. Reading achievement was significantly related to all recoverability scores.

Chronological age was not a factor in the performance of grade two pupils on selected criterion variables and significantly related at the first-grade level to performance on the total cloze test and cloze results on intact sentence structures. Boys and girls in the first grade performed similarly on cloze, oral reading and recoverability tests, but second-grade girls obtained significantly higher scores than the boys on the total cloze test and on cloze results on intact and deleted sentence structures.

CHAPTER X

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The major purpose of this study was to investigate the effect of selected deletion produced structures on the word identification and comprehension of beginning readers. It also investigated the occurrence of deletion produced structures in primary basal reading materials and in selected trade books. In addition, an attempt was made to establish validity for an oral response to the cloze at the first-grade level and to investigate the recoverability of deleted words in deletion produced structures.

This chapter will present a brief summary of the study and then outline the main findings. Conclusions will be drawn from these findings and the implications arising from the investigation will be examined. In addition, limitations of the study will be discussed and recommendations for further study suggested.

I. SUMMARY OF THE STUDY

Since this study was essentially concerned with the acquisition stage of reading, both word identification and comprehension were considered and a theoretical position outlined. The variable manipulated in the study was syntactic in nature and hence, a review of literature relating to the role of syntactic structure in both word identification and comprehension was carried out. This necessitated the establishment of a theoretical position from which to consider syntactic structure as well as a discussion of children's oral language facility.

In order to determine the effect of deletion produced structures on word identification and comprehension, the experimental study was conducted in two stages. The first involved simultaneous analysis of primary reading materials and delineation of deletion transformation rules to be investigated. The second involved collection and analysis of data to empirically test the hypotheses set out in Chapter I.

Two basal series and selected trade books were subjected to linguistic analysis. The results of this analysis in conjunction with limitations imposed by the research instruments were used to delineate the final set of 12 deletion transformations investigated in the study. Test passages were then reconstructed from stories in the Ginn Basic Readers so that each passage contained test sentences for all 12 deletion transformation rules. Half of these test sentences were presented as deletion produced structures and the other half in the intact form in each test passage. The effect of deletion produced structures on word identification was assessed by having pupils read these passages orally. Comprehension was assessed by applying the cloze technique to all passages ultimately deleting all words. Two test formats were employed to measure recoverability of deleted words, the first a modified cloze technique and the second a multiple choice test. This resulted in 16 forms of each of eight test passages at each grade level and necessitated a counterbalanced research design for collection of the data.

The population consisted of grades one and two pupils from seven elementary schools in a suburban Alberta community. A sample of 160 pupils at each grade level was randomly selected from this population. The Gates-MacGinitie Reading Tests were administered to all pupils in the test sample and these results were used to randomly stratify each grade sample into 16 groups.

In order to obtain both quantitative and qualitative information about the effects of deletion produced structures on word identification and comprehension, oral reading and cloze test results were marked on three dimensions, number, type and location. Data were then combined across test sentences for each version of each transformation rule and converted to proportion scores. A comparison was made between oral reading errors and cloze responses on sentences containing deletion produced structures and those on intact sentences using t-test programs. Correlations and one-way analysis of variance programs were also applied to the data.

II. MAIN FINDINGS AND CONCLUSIONS

Findings and conclusions will be discussed in relation to the two stages of this study. The first stage involved simultaneous analysis of primary reading materials and formulation of the set of deletion transformation rules to be investigated. The second stage involved collection and analysis of data.

Analysis of Primary Reading Materials

A preliminary analysis of basal reading materials in conjunction with limitations imposed by the research instruments restricted consideration in the present study to 12 optional deletion transformation rules. Each of these occurred in most levels of the two basal series analysed. After this set of transformation rules had been established, a more complete linguistic analysis was carried out and the results of this analysis are presented in this section.

There was a high incidence of sentences produced by deletion transformations in the basal preprimers, particularly in the Ginn Basic Readers. The percentage of deletion produced structures dropped sharply at the primer level, gradually increased until the beginning third reader, and then increased markedly at the high third reader level. The percentage of sentences containing structures produced by application of deletion transformation rules was higher in the trade books than in basals at all except the high third reader level. There was considerable uniformity across levels of the trade books in the percentage of sentences containing deletion produced structures with a limited number of transformation rules represented at the earlier levels.

In basal reading materials from the preprimer to beginning second reader levels, the most frequently occurring deletion produced structure was the "imperative deletion". There was a decline in the percentage of "imperatives" from the preprimer to high third reader levels of each basal series. In the Dr. Seuss books the percentage of deletion produced structures of this type increased across reader levels.

Common elements and "WH + BE" deletions also occurred relatively frequently in the primary reading materials analysed. Common elements deletions involving the noun phrase were more frequent than those involving the verb phrase.

Relatively few deletion produced structures were produced by "performative", "preposition", and "comparative" deletion transformations. "BE deletions" were also infrequently occurring structures in the basals but relatively frequent in the trade books.

Although there is an increase across reader levels in the frequency of deletion produced structures and in the number of different deletion produced structures represented, it must be concluded that the introduction and reinforcement of syntactic patterns is not systematically presented in the materials analysed in this study. Even at the preprimer level, a large number of deletion produced structures are present.

Collection and Analysis of the Data

Findings and conclusions from the second stage of the study will be presented in relation to the testing of hypotheses outlined in Chapter I. First, however, validity of the cloze tests at each grade level will be discussed.

Validity of the Cloze Tests. An oral response to the cloze test was required by the first-grade pupils in this study. Computations of correlation between scores obtained on the experimental cloze tests and on the comprehension subtest of the Gates-MacGinitie Reading Tests indicated that the cloze is a valid measure of comprehension for first graders when an oral response is required.

At the second-grade level, correlations between scores obtained on written cloze tests and the comprehension subtest of the Gates-MacGinitie test verified validity for the cloze procedure with pupils in grade two.

Hence, it was concluded that cloze tests are valid measures of comprehension at the beginning reading level when an oral response is accepted from first-grade pupils.

Effect of Deletion Produced Structures on Comprehension. In order to investigate the effect of deletion produced structures on the comprehension of first- and second-grade pupils, the following null hypothesis was tested.

1.1 There is no significant difference on cloze responses in sentences containing deletion produced structures and those containing intact sentence structures when each of the following characteristics of cloze responses are considered:

(a) number of correct responses
(b) type of errors
(c) location of exact replacements

for each particular transformation rule and for transformations as a group.

Number, type and location of cloze responses will be considered separately below.

(a) Number of correct responses

When deletion transformations were considered as a group, differences between cloze results on deleted and intact sentence structures were significant for pupils in grade one but not for those in the second grade. First-grade pupils obtained significantly more exact replacements on intact sentence structures. Hence, hypothesis 1.1 (a) is accepted for the second-grade sample but rejected at the first-grade level.

When intact and deleted sentence structures corresponding to each transformation rule were compared in terms of proportion of exact replacements, there was a tendency for deletion produced structures to be more difficult than the intact form. Hypothesis 1.1 (a) is rejected at the first-grade level for "WH + BE", "performative", and "noun phrase + verb + other elements" deletions and at the second-grade level for "BE", "performative", "verb phrase", "noun phrase", and "noun phrase + verb + other elements" deletion transformations. Data support hypothesis 1.1 (a) for all other deletion rules.

Differences in the proportion of exact replacements significantly favored the intact forms corresponding to those deletion produced structures found difficult to comprehend by pupils in the sample. Hence, it appears that comprehension of difficult deletion produced structures is enhanced by inserting words affected by the deletion transformation rules. This was true for the "comparative", "BE", "noun phrase + verb + other elements" and "performative" deletion rules. All of these except the "noun phrase + verb + other elements deletion" occur infrequently in primary reading materials. Several other deletion produced structures which occur much more frequently in first-grade reading materials were also difficult on cloze tests and the inclusion of words affected through deletion transformations did not enhance performance on these. Deletion rules for which this was the case include "WH + BE", "imperative", and "noun phrase" deletions. At the second-grade level, the insertion of words affected by deletion transformations facilitated cloze performance on most difficult deletion produced structures with the exception of those produced by the "WH + BE deletion". The intact form corresponding to "WH + BE deletion" was actually more difficult than the deleted form and this may reflect difficulty with comprehension of the connective.

When relatively easy deletion produced structures were considered, only one, that produced by "verb phrase deletion", was easier in the intact than deleted form and this was at the second-grade level. Hence, it was concluded that when students found a deletion produced structure difficult to comprehend, insertion of words affected by deletion transformations tended to aid comprehension but that this was not always true.

Addition of redundant contentive words appeared to aid comprehension on cloze tests more than the addition of syntactic markers. This is consistent with Bever's suggestion (1970) that sentence complexity is related to the amount of material that is implicit in the external structure since the child must contribute more information to the sentence himself. Bever suggests that semantic cues are dominant although children also use sequential properties of the sequence to isolate the logical relationships in the sentence. It is likely that many of the beginning readers in this study did not yet fully understand the function of syntactic markers and the relationships implied by them and relied on other strategies such as semantic constraints.

When children found the intact form for a deletion transformation rule easier than the deleted form, they tended to spontaneously change the deletion produced structure to its intact form as they read. Hence, although children were frequently able to predict the deleted material, addition of this material was a definite aid to performance on the cloze tests. The children did not have to contribute as much information to the sentence themselves when this redundant information was present and reconstruction of the meaning was easier. K. Goodman (1970) has suggested that even in beginning reading, there is some decoding directly to meaning with subsequent recoding of this meaning in the pupil's own language patterns. Changes from the deleted to intact sentence structure would tend to support this hypothesis.

(b) Type of errors

(i) proportion of errors syntactically acceptable in terms of the item involved and in terms of sentence context

(ii) proportion of errors semantically acceptable in terms of the item involved, sentence context and passage context

(iii) proportion of errors semantically and syntactically acceptable in terms of sentence context

(iv) proportion of errors neither semantically nor syntactically acceptable in terms of sentence context

When transformation rules were considered as a group, hypothesis b (i) was supported. There were few significant differences between intact and deleted forms in grammatical acceptability at the word level when rules were considered separately. Differences which did reach significance favored the intact form. Hence, when grammaticality was considered in terms of the item deleted, hypothesis b (i) was rejected for the "performative" and "imperative" deletions at the first-grade level, and for the "noun phrase deletion" at the second-grade level.

When sentence context was taken into account, hypothesis b (i) was rejected for "WH + BE", "performative", and "preposition" deletions for first-grade pupils, and for "noun phrase" and "comparative" deletions at the second-grade level. Data support hypothesis b (i) for all other transformation rules.

It was concluded, therefore, that the beginning readers in this study used their syntactic knowledge when comprehending both intact and deleted sentence structures and that the deletion of words through a syntactic transformation interfered with use of this knowledge in only a small number of instances.

More errors made by first-grade pupils were grammatical at the word than at the sentence level. There was little difference in performance by pupils in grade two at these two levels. This suggests that first graders were operating more at the word and phrase than at the sentence level and that pupils with one more year of reading experience are more cognizant of the total context. Both grade groups made use of their syntactic knowledge but first-grade subjects restricted themselves to smaller segments of language.

Few differences between intact and deleted forms were significant when semantic acceptability was considered. Data support hypothesis b (ii) for synonyms when all transformation rules were combined and for all rules in isolation except the "comparative deletion" at the second-grade level.

When transformation rules were combined, first graders made significantly more errors which were meaningful in relation to the passages and sentences on deleted than on intact sentence structures. Hence, hypothesis b (ii) was rejected for transformation rules as a group at the first-grade level. Data support this hypothesis for second-grade pupils.

When semantic acceptability at the passage level was considered for each transformation rule in isolation, hypothesis b (ii) was accepted for pupils in grade one. Second-grade subjects obtained significantly more errors in this category on the intact forms for "noun phrase" and "comparative" deletions. Hypothesis b (ii) was accepted for all other deletion transformations when passage context was considered.

When sentence context was considered, subjects in the first-grade obtained significantly more semantically acceptable errors on the deleted form of "noun phrase + auxiliary (verb) deletion" and on the intact form for the "performative" and "preposition" deletion transformations. Second-grade pupils obtained significantly more errors of this type on the intact forms corresponding to "noun phrase" and "comparative" deletion rules. Hypothesis b (ii) was accepted for other transformation rules at the sentence level.

It is clear that pupils used their semantic knowledge when confronted with both intact and deleted sentence structures and the change of syntactic structure investigated in this study had minimal effect on use of this knowledge.

Second-grade pupils made more errors which were semantically acceptable at the sentence and passage levels than did pupils in grade one. Pupils appeared to use larger units of language as they became more proficient in reading. This is consistent with results obtained by Y. Goodman (1967). Since word identification is seen as a prerequisite to comprehension at the beginning reading level, it is not surprising that pupils concentrate a great deal of attention at the word level.

When both grammatical and semantic acceptability of errors were considered, hypothesis b (iii) was accepted for transformation rules as a group and for all individual transformation rules except the "performative deletion" at the first-grade level and the "comparative deletion" for pupils in grade two.

Data for transformation rules as a group support hypothesis b (iv). First-grade pupils made significantly more unacceptable errors on the intact form of sentences corresponding to "WH", "BE", and "(that) + S as object" deletions. These were among the easiest deletion produced structures to comprehend and insertion of words affected by deletion transformations appeared to result in more unacceptable errors. They also made significantly more unacceptable errors on the deleted than intact form corresponding to the "imperative deletion". Second-grade pupils made significantly more errors in this category on the intact form corresponding to the "performative deletion" and on the deleted form of the "noun phrase deletion". Hypothesis b (iv) was supported for all other deletion transformation rules.

The interaction of grammatical and meaning cues was clearly demonstrated in the data although more errors were grammatically acceptable than semantically acceptable on both deleted and intact sentence structures. It is somewhat difficult to draw any definite conclusions, however, since it is almost impossible to empirically separate the influence of syntax and semantics. This is not surprising since syntax is considered essential to meaning beyond the word level.

(c) location of exact replacements

  (i) proportion of exact replacements preceding the deleted words or the words which could be deleted
  (ii) proportion of exact replacements following the deleted words or the words which could be deleted
  (iii) proportion of exact replacements occurring in the string to which the deletion transformation applies (conjoined/embedded string)
  (iv) proportion of exact replacements occurring in the matrix string

There were few significant differences between cloze results obtained on deleted and intact sentence structures when words preceding the point at which the deletion transformation applies were considered. Data for all transformation rules combined supported hypothesis c (i) at the first-grade level but not for the second-grade sample. Pupils in grade two made more exact replacements preceding the deletion transformation on deleted than on intact sentence structures. Differences in this direction were also significant on "(that) + S as object". At the grade one level, pupils obtained significantly more exact replacements preceding the point of deletion on the deleted form of the "WH + BE deletion" and on the intact form corresponding to the "comparative deletion". Hypothesis c (i) was accepted for all other transformation rules.

When words following the application of the deletion transformation were considered, hypothesis c (ii) was accepted for both grade groups for transformation rules as a group. Differences between intact and deleted forms significantly favored the intact form following the point at which "noun phrase + auxiliary (verb)" and "comparative" deletions apply for pupils in grade two. First-grade pupils also made more exact replacements on the intact form corresponding to the "BE deletion" on words following the deletion transformation. Hypothesis c (ii) was accepted for the other transformation rules.

Although there is a tendency for more exact replacements to be made on the deleted form preceding the deletion of words and on the intact form following this deletion, this factor accounts to only a limited extent for differential comprehension of intact and deleted sentence structures.

Few differences in cloze scores on intact and deleted sentence structures were significant when words in the matrix string of test sentences were considered. Hypothesis c (iv) was accepted for all but the "imperative" and "comparative" deletions at the first-grade level and the "comparative deletion" for second graders.

When words in the string to which the deletion transformation had applied were considered, the embedded or conjoined string, differences tended to favor the intact form. With transformation rules combined, hypothesis c (iii) was rejected for pupils in the first grade and accepted for those in grade two. Grade one pupils also obtained significantly more exact replacements on the intact form corresponding to "BE deletion", but differences favored the deleted form on "(that) + S as object" and "imperative" deletions. At the second-grade level, pupils scored significantly better on the intact form for several transformation rules, namely "BE", "imperative", "verb phrase", "noun phrase + auxiliary (verb)", "noun phrase + verb + other elements", and "comparative" deletion rules.

It is apparent, then, that the impact of the deletion transformation rule on comprehension was largely restricted to the string to which the transformation rule had applied. This is the string from which redundant information had been deleted and the one on which the child had to supply a great deal of information himself in reconstruction of meaning.

Effect of Deletion Produced Structures on Word Identification. In order to investigate the effect of deletion produced structures on the word identification of first- and second-grade pupils, the following null hypothesis was tested.

1.2 There is no significant difference in oral reading errors on sentences containing deletion produced structures and those containing intact sentence structures when the effect of word identification in isolation is taken into consideration and the following characteristics of oral reading errors are considered:

(a) number of errors
(b) type of errors
(c) location of errors

for each particular transformation rule and for transformations as a group.

(a) number of errors

When transformation rules were considered as a group, there was a significant difference between intact and deleted sentence structures at the second-grade level with more errors on the deleted form. This difference was not significant for the first-grade sample. These data support hypothesis 1.2 (a) for first graders but not for pupils in grade two.

When each transformation rule was considered individually, few differences between intact and deleted sentence structures were significant. First-grade pupils made significantly more errors on the intact form corresponding to the "imperative deletion" and those in the second grade made more errors on the deleted form of the "performative deletion". This last structure was very difficult for the second-grade sample and fortunately was not a frequently occurring structure in materials at this level. Hypothesis 1.2 (a) was accepted for most transformation rules and the conclusion drawn that the deletion of words by an optional transformation rule did not appear to be a significant factor in overall word identification at the beginning stage of reading.

From these results it appears that deletion of words has a much greater impact on comprehension than on word identification. It appears that the presence of redundant material aids comprehension much more than word identification since more information is included in the visual input and less information must be predicted by the child. When identifying words the child attempts to provide an acceptable oral production, a production which is consistent with his knowledge of language patterns. Since Menyuk (1969) and others have demonstrated the presence of deletion produced structures in the oral language of beginning readers, oral production of a deletion produced structure would be as consistent with oral language patterns as the corresponding intact form.

There was little difference in the number of oral reading errors made on different deletion produced structures although in general those which were difficult to read orally were also those which had been difficult on the cloze tests. One would expect this since, at the beginning stage of reading, word identification is seen as a prerequisite to meaning identification.

First-grade pupils tended to correct more errors on intact than on deleted sentence structures but this trend was not apparent at the second-grade level. Spontaneous changes in grammatical structure tended to involve changes to the deleted rather than to the intact form as Beaver (1968) and others have suggested. Both grade groups omitted syntactic markers such as to, that and relative pronouns, although contentives in noun phrases were also omitted. On the cloze tests, most changes had been from the deleted to intact forms. Choice of the intact or deleted form appeared to be somewhat idiosyncratic on the oral reading tests with some children making several similar choices. On the oral reading tests, pupils appeared to be striving for an oral production consistent with their typical mode of language processing, whereas on the cloze tests, they were probably seeking maximum information.

(b) type of errors

(i) proportion of errors syntactically acceptable in terms of the item involved and in terms of sentence context
(ii) proportion of errors semantically acceptable in terms

of the item involved, sentence context and passage context

When grammaticality of errors was considered, there were few significant differences in the number of oral reading errors made on deleted and intact sentence structures although, as on the cloze tests, there was a tendency for more errors in this category to be made on the intact form. Considering transformation rules as a group, hypothesis b (i) was accepted for pupils in both grades.

First-grade pupils obtained significantly more grammatically acceptable errors at the word level on the intact than deleted forms corresponding to "performative" and "noun phrase" deletions. Hypothesis b (i) was accepted when grammaticality was considered in terms of the item for other transformation rules at the first-grade level and for all rules at the second-grade level.

When sentence context was taken into account, there were significantly more errors on the deleted than the intact forms corresponding to "noun phrase deletion" for first-grade pupils and the "imperative", "preposition", "noun phrase", and "noun phrase + verb + other elements" deletions for pupils in the second grade. Data support hypothesis b (i) for all other rules on this category of errors.

Both grade groups made use of grammatical sentence context when reading orally whereas on the cloze tests, first graders made less use of this wider context than did pupils in the second grade. However, pupils in grade one did make more errors in the same grammatical category as the expected response than pupils did in grade two suggesting more reliance on syntactic cues at the word and phrase level on the oral reading task as well.

Very few oral reading errors could be classified as synonyms and hypothesis b (ii) was accepted when semantic acceptability of errors was considered at the word level.

When sentence and passage context were considered and transformation rules were combined, data supported hypothesis b (ii) at the first-grade level but not for second graders. These latter pupils made more semantically acceptable errors on intact than deleted sentence structures. There were also significantly more semantically acceptable errors at the passage level on the intact than deleted forms corresponding to "noun phrase deletion" for first-grade pupils and "preposition", "noun phrase", and "noun phrase + verb + other elements" deletions for those in grade two. At the sentence level, first graders made more semantically acceptable errors on the intact forms for "noun phrase" and "noun phrase + verb + other elements" deletions, and second graders on the "imperative", "preposition", "noun phrase", and "noun phrase + verb + other elements" deletions. Hypothesis b (ii) was accepted for other transformation rules at the sentence and passage levels.

There was considerable overlap in semantic and grammatical acceptability with pupils obtaining more errors in both categories on the same transformation rules. This indicates once again the integrated use of semantic and syntactic cues as children read orally. As on the cloze tests, however, a larger proportion of errors were grammatically than semantically acceptable suggesting that implicit knowledge of syntactic structure may be of primary importance. This is consistent with findings of several others such as Clay (1968), Weber (1970) and Y. Goodman (1967).

(c) location of errors

- (i) proportion of errors preceding the deleted words or the words which could be deleted
- (ii) proportion of errors following the deleted words or the words which could be deleted
- (iii) proportion of errors occurring in the string to which the deletion transformation applies (conjoined/embedded)
- (iv) proportion of exact replacements occurring in the matrix string

The location of words was a much less significant factor in oral reading than it had been on the cloze tests. When words preceding the application of the deletion transformation were considered, hypothesis c (i) was accepted for transformation rules as a group and for all transformation rules individually except the "comparative deletion" at the first-grade level and the "noun phrase + auxiliary (verb) deletion" for second graders. More errors were made on the intact forms corresponding to these two deletion transformations.

Data supported hypothesis c (ii) for the grade one sample but not for the second graders who made significantly more errors on deleted than intact sentences. Significantly more errors were also made following the deletion transformation on the deleted form of "noun phrase + auxiliary (verb) deletion" by first graders but hypothesis c (ii) was accepted for all other rules.

Hence, although there was a tendency for more errors to be made on the intact form preceding the deletion transformation and on the deleted form following it, this could be generalized to few transformation rules and was considered to be of minimal significance in differential word identification on deleted and intact sentence structures.

Hypothesis c (iv) was accepted for both grade groups on transformations as a group and for all rules individually except the "comparative deletion" at the first-grade level. First graders obtained more errors on the intact form of this transformation rule.

Hypothesis c (iii) was also accepted for pupils in both grades when transformation rules were considered as a group and on all individual rules except the "comparative deletion" for both grade groups and the "noun phrase + auxiliary (verb) deletion" at the first-grade level. More errors were made on the intact form of the "imperative" and the deleted form of the "noun phrase + auxiliary (verb) deletion".

It was concluded that location in the matrix or embedded/conjoined string was not a significant factor in word identification and that difficulty or ease involved the entire sentence rather than the specific string to which the deletion transformation had been applied. This was a factor in comprehension with the impact of the deletion transformation restricted to the embedded or conjoined string.

Recoverability. To investigate recoverability of deleted words, the following null hypothesis was tested.

2. Recoverability of deleted words is not significantly related to:
   (a) proportion of oral reading errors or correct cloze responses on deleted and intact sentence structures
   (b) differences in the proportion of correct cloze responses on sentences containing deletion produced structures as compared to those with sentences left intact

Scores on both recoverability tasks were significantly related to cloze scores on deleted and intact sentence structures. Scores were not significantly related to differential performance on the deleted and intact forms and the recoverability tasks appeared to involve a general comprehension factor instead. Hence, hypothesis 2 (a) was rejected for cloze test results and 2 (b) was accepted.

Number of oral reading errors and recoverability scores were not significantly related at the first-grade level but there was a significant relationship between number of errors on deleted sentence structures and recoverability at the second-grade level. More oral reading errors were made on those deletion produced structures which had been difficult on the recoverability tests. Hypothesis 2 (a) was therefore accepted for oral reading results at the first-grade level but rejected for second graders.

Relationship of Selected Bias and Criterion Variables. The following null hypothesis was tested.

3. There is no significant relationship between the following variables:

    (a) reading achievement
    (b) chronological age
    (c) sex

    and the following criterion variables:

    (i) recoverability scores
    (ii) proportion of oral reading errors and correct cloze responses on deleted and intact sentence structures

Reading achievement scores were significantly related to chronological age at the first-grade level with older pupils performing better than those younger, and to sex at the second-grade level with girls performing better than boys. Standardized reading achievement scores were significantly related to cloze test results on deleted and intact sentence structures but not to differential performance between the two. The proportion of oral reading errors made by first graders was not significantly related to standardized reading results but this relationship was significant for subjects in grade two. Hypothesis a (ii) was rejected for all cloze results and for oral reading results at the second-grade level. It was accepted for first-grade subjects on the oral reading tests. The presence of deletion produced structures appeared to negatively affect the word identification of poor readers in grade two more than it did good readers. Reading achievement was significantly related to all recoverability scores, and hence, hypothesis a (i) was rejected.

Chronological age was not related to cloze, oral reading or recoverability scores at the second-grade level, supporting hypotheses b (i) and (ii). There was a significant relationship between chronological age and cloze scores made by pupils in grade one. Hypothesis b (i) was accepted but b (ii) was rejected for cloze tests results.

Sexual status was not significantly related to performance on any of the criterion variables at the first-grade level but at the second-grade level, girls performed better than boys on all cloze tests. Hence, hypothesis c (i) was accepted but c (ii) was rejected for second-grade cloze results.

III. IMPLICATIONS OF THE STUDY

The findings of this investigation have implications for theories of beginning reading, provision of appropriate instructional materials and programs, and the psychological reality of transformational grammar.

A Theory of Beginning Reading

Simons (1971) has made a strong plea for theory based research in the field of reading. He suggests that a sound theory will lead to research which will provide an understanding of the psychological processes that underlie reading. An attempt was made in Chapters II and III to outline a theoretical position for reading at the acquisition stage as well as a linguistic framework within which to consider syntactic structure.

Reading, in the acquisition stage, is viewed as a two stage process involving identification of graphic symbols and comprehension. The process of word identification is seen as involving two constructive acts: synthesis of a visual word or spelling pattern, and synthesis of a verbal response. The figural synthesis depends partly on features extracted from the visual input but also on set and context.

Meaning is viewed as the interaction of meaning potentialities of words, semantic and syntactic context and the situational frame of reference. Even at the acquisition stage, reading for meaning is not seen as word-by-word processing but rather as a predictive, hypothesis testing language processing activity (Ryan and Semmel, 1969). Redundancy in the language generally reduces the amount of visual input necessary for more proficient readers (Smith, 1971).

The results of this study confirm research reports which suggest that beginning readers bring their knowledge of language to the printed page when reading orally (Y. Goodman, 1967; Clay, 1968; Weber, 1970). The study also clearly demonstrates that pupils make even greater use of this knowledge when confronted with a comprehension task than with one involving accuracy of oral reading.

The deletion of words in the surface structure through a syntactic transformation had only minimal effect on word identification. Students appeared to be striving to present an oral production consistent with their language knowledge and both intact and deleted sentence structures met these criteria. The deletion of redundant contentive information on a comprehension task, on the other hand, required pupils to provide much more information themselves and comprehension was negatively affected (Bever, 1970). Deletion of syntactic markers had far less impact on comprehension suggesting that pupils rely more on semantic constraints than on function words to determine logical relationships in sentences.

Instructional Materials and Programs

Children come to school with considerable knowledge of language patterns and semantic constraints. Beginning reading instruction rarely takes advantage of this knowledge and instead, the emphasis is frequently on precise word identification with considerable time spent on words in isolation. Instructional programs should be developed to take advantage of the linguistic knowledge possessed by beginning readers. The sentence structures presented in beginning reading material should reflect the receptive and expressive language facility of six-year-old children. This material should also contain as much contentive information as possible since presence of this information in the external sentence structure makes written material easier for beginning readers to understand.

The emphasis in beginning reading material appears to be on vocabulary control, with little attempt to introduce syntactic structures sequentially. If the goal of reading instruction is word identification, present materials may be appropriate. If reading is viewed as a communication process, however, these materials may not be facilitating reading progress. It appears that the short, fragmentary sentences present in most introductory reading material are difficult for beginning readers to comprehend. Presence of redundant information tends to make material easier for pupils at this level to understand because more information is present in the external sentence structure. Hence, deletion produced structures should be avoided by authors and publishers of beginning reading material. Generally, intact sentence structures should be presented instead, but some of the sentence structures investigated in this study were difficult to understand in either the deleted or intact form. The "imperative deletion", in particular, occurs very frequently in beginning basal reading material, and it appears that both the intact and deleted forms corresponding to this deletion transformation should be avoided if the major goal of instruction is comprehension. Interestingly, the "imperative deletion" did not occur as frequently in the beginning levels of the Beginner Books as in the basal readers.

Since it is unlikely that material will be controlled for syntactic structure in the near future, teachers should be made aware, both through preservice and inservice education, of the difficulty that fragmentary sentences can cause to beginning readers. Basic knowledge of linguistics, particularly of English syntactic patterns, would be helpful in this regard. Teachers who are aware of syntactic structure and of the difficulty caused by deletion produced structures can select material with this variable in mind. Until more appropriate materials are available, however, teachers will have to continue using introductory texts containing some short, fragmentary sentences. When using these materials, instructional sequences should be specifically planned and developed to help pupils understand deletion produced structures. Since subjects in the present study were able to recognize equivalence class relationships between intact and deleted forms, the intact form could be presented along with each deletion produced structure to foster comprehension.

Ideally, then, it appears that materials should be developed which avoid deletion produced structures during the initial stage of reading instruction. Following this, deletion produced structures should probably be introduced in a controlled sequential manner with lessons developed to help pupils understand these sentences.

It is apparent from results in this study that first-grade pupils use syntactic and semantic cues at the word and phrase level more than they use wider context. As readers become more proficient, they use larger units of language as they read. Although some work with context clues is included in most beginning reading programs, there ~~is~~ need for instruction related to use of both syntactic and semantic cues. Children should constantly monitor their reading by asking themselves: Does that sound right? Does that make sense? More specifically, beginning readers should be taught to develop an awareness of and ability to use total sentence and passage context to identify words and meaning. They now use preceding context but frequently ignore subsequent words in a difficult sentence.

Teaching is probably also necessary to help beginning readers make use of syntactic markers when reading for meaning. They appear to rely heavily on contentive information in sentences, but as more complex sentences are presented, understanding of syntactic markers will become increasingly important to an understanding of the relationships among contentive words.

The cloze technique appears to be a valid measure of reading comprehension at the beginning reading level when an oral response to the cloze test is accepted. It is one of the few comprehension instruments which provides an indication of the strategies and cues used by readers during the comprehension process. It yields diagnostic information for classroom, clinical and research purposes.

Psychological Reality of Transformational Grammar

Although the present study was not directly concerned with the psychological reality of transformational grammar, some of the findings have implications for this issue. The basic postulate of those who uphold the psychological reality of grammar is that speech behavior reflects in some direct way the abstract linguistic structures in transformational grammar. More specifically, the derivational theory of complexity states that the complexity of a sentence is directly related to the number of transformation rules in its derivation. Since the deleted and intact sentence structures presented in this study differ by the application of one transformation rule, cloze test results provide some indication of the viability of the derivational theory of complexity for several deletion transformation rules.

Although there was a tendency for more correct cloze responses on the intact than deleted forms as would be predicted by the derivational theory of complexity, this was certainly not true for all transformation rules. In fact, on test sentences for the "WH + BE deletion", the opposite trend was evident. Factors such as the nature of the material deleted appeared to have a more significant impact on comprehension than the fact that the sentences differed by one transformation rule. It is more likely, as Bever (1970) has suggested, that complexity will have to be explained by recourse to psychological rather than linguistic processes and that there will be no one-to-one relationship between these.

The present study also looked at recoverability to see if a psychological correlate to Chomsky's linguistic recoverability of deleted elements could be discovered. Results do not suggest that this psychological correlate involves spontaneous prediction of deleted words since pupils found this task very difficult. Pupils were able, however, to recognize systematic paraphrastic relationships between intact and deleted forms of all transformation rules. Spontaneous changes in syntactic structure also involved changes to both the deleted and intact forms. Hence, it appears that children treat deleted and intact sentence structures as if they were members of an equivalence class. The deleted form is not treated as a derived form of the intact sentence structure.

IV. LIMITATIONS OF THE STUDY

The major limitation of this study, beyond those noted in Chapter I, is that inferences about process have been made from overt behavioral responses. Inferences about the cognitive strategies and linguistic knowledge used in word identification have been drawn from oral reading errors. The assumption has been made that the child uses the same strategies when he makes errors as when he reads words correctly. It is possible that the child brings different or a different combination of strategies to bear when he experiences difficulty.

Inferences about the comprehension process were drawn from responses made on the experimental cloze tests. Simons (1971) has pointed out several advantages of this test but one disadvantage is that it presents a somewhat artificial reading situation by interrupting reading and requiring a response every n^{th} word. Although comprehension is seen as a predictive language processing activity, in the actual reading situation, the visual stimulus is present for partial or complete sampling. One further limitation was imposed by the oral response to the cloze procedure. Children rarely corrected responses because they were unable to go back and see what response they had made. In reading for meaning, rereading occurs when the meaning constructed is not consistent with subsequent context.

A final limitation of this study involved administration of the research instruments. The cloze tests were novel to most of the pupils in the study and some found them very frustrating. Some pupils also took a long time to complete the cloze tests and fatigue was a factor in their performance. The counterbalanced nature of the research design should have largely overcome the effect of this factor.

V. SUGGESTIONS FOR FURTHER RESEARCH

This study has suggested that the presence of redundant contentive information helps beginning readers reconstruct the meaning of sentences and passages. When redundant material is deleted, the reader must supply more of the information himself and this is difficult for beginning readers. A study similar to the comprehension section of this study could be conducted with pupils at varying stages of proficiency in reading to determine the effect of insertion of redundant information beyond the beginning level.

This study considered only one aspect of syntactic structure and the effect of this on beginning reading. There are several other syntactic patterns in beginning reading materials which merit investigation. Fagan's study (1969) provides an excellent source for determining which syntactic structures to consider. Embedding transformations, for example, were also difficult for his population and should be investigated in more depth to determine how and if possible why these structures are related to comprehension difficulties.

It would also be useful to have a more complete linguistic analysis of several beginning reading series using the transformational grammar model. This information would enable one to plan instructional sequences related to the more prevalent structures and to investigate the relative ease or difficulty of these structures.

The effect of deletion produced structures was measured in test sentences which were embedded in a passage context. It would be interesting to determine the effect of these structures on comprehension of sentences presented in isolation. One would postulate an even greater impact on comprehension.

Some writers have suggested that pupils have difficulty with reading material when there is a mismatch between their oral language and the written language of the reading material (Weiner and Cromer, 1967). Since deletion produced structures have proven difficult for reading comprehension, they appear to warrant further investigation in oral language production and comprehension. The relationships among oral production, aural comprehension and reading comprehension could also be investigated.

Bever (1970) has suggested that children make use of strategies of segmentation, semantic labelling, sequential labelling and lexical potentialities to isolate sentence units and to assign functional relations within these units. In light of findings in this study, his work appears to have many implications for subsequent research in beginning reading.

VI. CONCLUDING STATEMENT

This study was concerned with the effect of deletion produced structures on the word identification and comprehension of beginning readers.

Results have confirmed findings that beginning readers bring their knowledge of language to the printed page when reading orally (Y. Goodman, 1967; Clay, 1968; Weber, 1970), and have shown that these children are able to effectively use this knowledge when confronted with both deleted and intact sentence structures. There has been little direct evidence, however, on the use of these strategies for comprehension. This study has suggested that beginning readers make even greater use of their language knowledge when reading for meaning than when identifying words. They also rely heavily on contentive information in the written material.

Introductory materials have frequently been criticized for the syntactic patterns in which stories are presented. This study has provided experimental evidence to show that many of the short fragmentary sentences in introductory materials are difficult for beginning readers to comprehend.

REFERENCES

Anisfeld, M. The child's knowledge of English pluralization rules. Project Literacy Reports, 1966, 7, 45-51.

Ammons, P.R. Some research on the comprehension of sentences. Child Study, 1968-69, 30, (4), 14-18.

Bach, E. An introduction to transformational grammar. New York: Holt, Rinehart and Winston, Inc., 1964.

Beaver, J.C. Transformational grammar and the teaching of reading. Research on the Teaching of English, 1968, 2, 161-171.

Becker, F.M. A description of observed oral reading phenomena of grade four children. Unpublished masters thesis, University of Alberta, 1970.

Bever, T.C. The cognitive basis for linguistic structures. In J.R. Hayes (Ed.), Cognition and the development of language. Toronto: John Wiley & Sons, Ltd., 1970.

Biemiller, A. The development of the use of graphic and contextual information as children learn to read. Reading Research Quarterly, 1970, 6, (1), 75-96.

Bormuth, J.R. Experimental applications of cloze tests. International Reading Association Conference Proceedings, 1964, 9, 303-306.

Bormuth, J.R. Factor validity of cloze tests as measures of reading comprehension ability. Reading Research Quarterly, 1969, 4, (3), 358-365.

Bormuth, J.R. Validities of grammatical and semantic classifications of cloze test scores. International Reading Association Conference Proceedings, 1965, 10, 283-286.

Bougere, M.B. Selected factors in oral language related to first-grade reading achievement. Unpublished doctoral dissertation, University of Chicago, 1968.

Braun, C. A transformational analysis of syntactic development of children from varying ethno-linguistic communities. Winnipeg: Manitoba Department of Youth and Education, 1969.

Brown, E. Levels of syntactic realization in oral reading. Paper presented at the National Reading Conference, Tampa, Florida, December 1971.

Brown, E. The bases of reading acquisition. Reading Research Quarterly, 1970, 6, (1), 49-74.

Brown, H.D. Children's comprehension of relativized English sentences. Child Development, 1971, 42, 1923-1936.

Brown, R., and Hanlon, C. Derivational complexity and order of acquisition in child speech. In J.R. Hayes (Ed.), Cognition and the development of language. Toronto: John Wiley & Sons Ltd., 1970.

Burt, M.K. From deep to surface structure: an introduction to transformational syntax. New York: Harper and Row, 1971.

Cairns, C., and Silva, D. How children learn language. Future School Study Project, Albuquerque Public Schools, New Mexico. Washington, D.C.: Office of Education, September 1969.

Carroll, J.B. The nature of the reading process. In H. Singer and R.B. Ruddell (Eds.), Theoretical models and processes of reading. Newark, Delaware: International Reading Association, 1970.

Chafe, W.L. Meaning and the structure of language. Chicago: The University of Chicago Press, 1970.

Chall, J.S. Forward. In T.S. Geisel, Hop on pop. Toronto: Random House of Canada, 1963.

Chall, J.S. Readability: An appraisal of research and application. Bureau of Educational Research Monographs, No. 34. Columbus, Ohio: State University, 1958.

Chomsky, C. The acquisition of syntax in children from 5 to 10. Cambridge, Massachusetts: M.I.T. Press, 1969.

Chomsky, C. Stages in language development and reading exposure. Harvard Educational Review, 1972, 42, 1-33.

Chomsky, N. Aspects of the theory of syntax. Cambridge, Massachusetts: M.I.T. Press, 1965.

Chomsky, N. Syntactic structures. The Hague: Mouton & Co., 1957.

Chomsky, N., and Halle, M. The sound pattern of English. New York: Harper and Row, 1968.

Clay, M.M. A syntactic analysis of reading errors. Journal of Verbal Learning and Verbal Behaviour, 1968, 7, 434-438.

Crosby, R.M.N., and Liston, R.A. The waysiders: A new approach to reading and the dyslexic child. New York: Delacorte Press, 1968.

Denner, B. Representational and syntactic competence of problem readers. Child Development, 1970, 41, 881-887.

Derwing, B.L. Transformational grammar as a theory of language acquisition. Cambridge Studies in Linguistics. New York: Cambridge University Press, 1973.

Fagan, W.T. An investigation into the relationship between reading difficulty and the number and types of sentence transformations. Unpublished doctoral dissertation, University of Alberta, 1969.

Fillmore, C.J. The case for case. In E. Bach and R.T. Harms (Eds.), Universals in linguistic theory. New York: Holt, Rinehart and Winston, 1968.

Findlay, J.N. Use, usage and meaning (2). In G.H.R. Parkinson (Ed.), The theory of meaning. London: Oxford University Press, 1968.

Fodor, J.A., and Garrett, M. Some reflections on competence and performance. In J. Lyons and R.J. Wales (Eds.), Psycholinguistic Papers. Edinburgh: Edinburgh University Press, 1966.

Fodor, J.A., and Garrett, M. Some syntactic determinants of sentential complexity. Perception and Psychophysics, 1967, 7, 289-296.

Fry, M.A. A transformational analysis of the oral language structure used by two reading groups at the second-grade level. Unpublished doctoral dissertation, University of Iowa, 1967.

Gallant, R. Use of cloze tests as a measure of readability in the primary grades. International Reading Association Conference Proceedings, 1965, 10, 283-286.

Gamlin, P. The interaction of meaning and syntax in sentence comprehension. Child Study, 1968-69, 30, (4), 3-13.

Gates, A.I., and MacGinitie, W.H. Gates-MacGinitie reading tests. Columbia University, New York: Teachers College Press, 1965.

Goodman, K.S. A linguistic study of cues and miscues in reading. Elementary English, 1965, 42, 639-643.

Goodman, K.S. Decoding: from code to what? Journal of Reading, 1971, 14, 455-462.

Goodman, K.S. The psycholinguistic nature of the reading process. In K.S. Goodman, The psycholinguistic nature of the reading process. Detroit: Wayne State University Press, 1968.

Goodman, K.S. Reading: A psycholinguistic guessing game. Journal of the Reading Specialist, 1967, 4, 126-135.

Goodman, K.S., and Burke, C. A study of oral reading miscues that result in grammatical re-transformations. (Final Report of Project No. 5425) United States Department of Health, Education and Welfare, 1969.

Goodman, K.S., and Goodman, Y.M. A linguistic taxonomy of cues and miscues in reading. A paper presented at the Symposium on the Psycholinguistic Nature of the Reading Process, Wayne State University, 1965.

Goodman, K.S., and Niles, O.S. Reading: Process and program. Champaign, Illinois: National Council of Teachers of English, 1970.

Goodman, Y.M. A psycholinguistic description of observed oral reading phenomena in selected young beginning readers. Unpublished doctoral dissertation, Wayne State University, 1967.

Goodman, Y.M. et al. Studies in reading miscues. Paper presented at the International Reading Association Conference, Kansas City, 1969.

Gray, W.S. Gray oral reading tests: Manual of directions for administering, scoring and interpretation. New York: Bobbs-Merrill Company Inc., 1963.

Gray W.S. The major aspects of reading. Sequential development of reading abilities. Supplementary Educational Monographs, No. 90. Chicago: University of Chicago Press, 1960.

Gray, W.S., and Leary, B.E. What makes a book readable. Chicago: University of Chicago Press, 1935.

Guide for Librarians and Teachers. Toronto: Random House of Canada Limited, 1973.

Harris, Z. Papers in structural and transformational linguistics. Dordrecht-Holland: D. Reidel Publishing Co., 1970.

Holmes, D.L., and Smith, F. The independence of letter, word and meaning identification in reading. Reading Research Quarterly, 1971, 6, 394-415.

Jacobs, R.S., and Rosenbaum, P.S. English transformational grammar. Toronto: Blaisdell Publishing Company, 1968.

Jenkinson, M.D. Basic elements of reading comprehension. Paper presented to the Second World Congress on Reading, Copenhagen, August 1968.

Jenkinson, M.D. Selected processes and difficulties of reading comprehension. Unpublished doctoral dissertation, University of Chicago, 1957.

Katz, J.J., and Fodor, J.A. The structure of a semantic theory. Language, 1963, 39, 170-210.

Katz, J.J., and Postal, P.M. An integrated theory of linguistic descriptions. Cambridge, Massachusetts: M.I.T. Press, 1964.

Kolers, P.A. Three stages of reading. In H. Levin and J. Williams (Eds.), Basic studies on reading. New York: Basic Books, 1969.

Lakoff, G., and Peters, S. Phrasal conjunction and symmetric predicates. In D.A. Reibel and S.A. Schane (Eds.), Modern studies in English: Readings in transformational grammar. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.

Latham, R.O.M. Cognitive synthesis and the comprehension of written language. Unpublished doctoral dissertation, University of Alberta, 1973.

Levin, H. Studies of various aspects of reading. Project Literacy Reports, 1965, 5, 13-25.

Levin, H., and Kaplan, E.L. Grammatical structure and reading. In H. Levin and J. Williams (Eds.), Basic studies on reading. New York: Basic Books, 1969, 119-133.

Loban, W.D. The language of elementary school children. NCTE Research Report, No. 1. Champaign, Illinois: National Council of Teachers of English, 1963.

Locke, J. Of words. In D.E. Hayden (Ed.), Classics in semantics. New York: Philosophical Library, 1965.

Lorge, I. Predicting readability. Teachers College Record, 1944, 45, 404-419.

McCarthy, D.A. Language development in children. In L. Carmichael (Ed.), A manual of child psychology. New York: John Wiley & Sons, Inc., 1954.

McCawley, J.D. The role of semantics in a grammar. In E. Bach (Ed.), Universals in linguistic theory. New York: Holt, Rinehart and Winston, 1968.

McInnes, J.A. (Ed.) Teacher's Guidebook for Funny Surprises, Kittens and Bears, and Pets and Puppets. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1970.

MacKinnon, A.R. How DO children learn to read? Toronto: Copp-Clark Publishing Co., Limited, 1959.

McNeill, D. Developmental psycholinguistics. In F. Smith and G.A. Miller (Eds.), The genesis of language: A psycholinguistic approach. Cambridge, Massachusetts: M.I.T. Press, 1966.

Mackworth, J.F. Some models of the reading process: Learners and skilled readers. *Reading Research Quarterly*, 1972, 7, (4), 701-733.

Mackworth, N.H. Seven cognitive skills in reading. *Reading Research Quarterly*, 1972, *7*, (4), 679-700.

Mehler, J., Bever, T., and Carey, P. What we look at when we read. *Perception and Psychophysics*, 1967, 2, 213-218.

Menyuk, P. *Sentences children use*. Research Monographs No. 52. Cambridge, Massachusetts: M.I.T. Press, 1969.

Menyuk, P. Syntactic structures in the language of children. *Child Development*, 1963, *34*, (2), 407-422.

Morris, C.W. *Foundations of the theory of signs*. International Encyclopedia of Unified Science, I, (2). Chicago: University of Chicago Press, 1938.

Morton, J.A. A model for continuous language behavior. *Language and Speech*, 1964, 7, 40-70.

Neisser, U. *Cognitive psychology*. New York: Appleton-Century-Crofts, 1967.

Nurss, J.R. Oral reading errors and reading comprehension. *The Reading Teacher*, 1969, *22*, (6), 523-528.

O'Donnell, R.C., Griffin, W.J., and Norris, R.C. *Syntax of kindergarten and elementary school children: A transformational analysis*. NCTE Research Report, No. 8. Champaign, Illinois: National Council of Teachers of English, 1967.

Ogden, C.R., and Richards, I.A. *The meaning of meaning*. New York: Harcourt, Brace and Company, 1923.

Osgood, C.E., Suci, G., and Tannenbaum, P. The logic of semantic differentiation. In S. Saporta (Ed.), *Psycholinguistics: A book of readings*. New York: Holt, Rinehart and Winston, 1961.

Prideaux, G.D. Surface structure resolution of structural ambiguity. Revision of an invited paper presented at the University of Toronto, March 1972.

Ransom, P.E. Determining reading levels of elementary school children by cloze testing. *International Reading Association Conference Proceedings*, 1968, *12*, (1), 477-482.

Robertson, J.E. An investigation of pupil understanding of connectives in reading. Unpublished doctoral dissertation, University of Alberta, 1966.

Rommetveit, R. Words, meanings and messages. New York: Academic Press, 1968.

Ruddell, R.B. The effect of the similarity of oral and written patterns of language structure on reading comprehension. Unpublished doctoral dissertation, Indiana University, 1963.

Ryan, E.B., and Semmel, M.I. Reading as a constructive language process. Reading Research Quarterly, 1969, 5, (1), 59-83.

Shandling, R. A clinical study of auditory perceptual and oral reading patterns in a group of dyslexic boys. Unpublished masters thesis, University of Alberta, 1970.

Simons, H.D. Reading comprehension: The need for a new perspective. Reading Research Quarterly, 1971, 6, (3), 338-363.

Smith, C.S. Ambiguous sentences with AND. In D.A. Reibel and S.A. Schane (Eds.), Modern studies in English: Readings in transformational grammar. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.

Smith, F. Psycholinguistics and reading. New York: Holt, Rinehart & Winston, Inc., 1973.

Smith, F. Understanding reading. New York: Holt, Rinehart & Winston, Inc., 1971.

Strickland, R.G. The language of elementary school children: Its relationship to the language of reading textbooks and the quality of reading of selected children. Bulletin of the School of Education. Bloomington: Indiana University, 1962.

Taylor, W.L. Cloze procedure: a new tool for measuring readability. Journalism Quarterly, 1953, 30, 415-433.

Taylor, W.L. Recent developments in the use of the cloze procedure. Journalism Quarterly, 1956, 33, 42-48.

Tatham, S.M. Reading comprehension of materials written with select oral language patterns: A study at grades two and four. Reading Research Quarterly, 1970, 5, (3), 427-451.

Vogel, M., and Washburne, C.W. An objective method of determining grade placement of children's reading material. Elementary School Journal, 1928, 26, 373-381.

Watts, W.C. On two hypotheses concerning psycholinguistics. In J. Hayes (Ed.), Cognition and the development of language. Toronto: John Wiley & Sons, Inc., 1970.

Weaver, W.W., and Kingston, A.J. A factor analysis of the cloze procedure and other measures of reading and language ability. Journal of Communication, 1963, 13, 252-261.

Weber, R. A linguistic analysis of first-grade reading errors. Reading Research Quarterly, 1970, 5, (3), 427-451.

Weber, R. First-graders' use of grammatical context in reading. In H. Levin and J. Williams (Eds.), Basic studies on reading. New York: Basic Books, 1969.

Weiner, M., and Cromer, W. Reading and reading difficulty: A conceptual analysis. Harvard Educational Review, 1967, 37, 620-643.

Wittgenstein, L. Philosophical investigations. Translated by G.E.M. Anscombe. New York: MacMillan Co., 1953.

Zintz, M. The reading process: The teacher and the learner. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1970.

LIST OF PRIMARY READING MATERIALS

Geisel, T.S. Green eggs and ham. Toronto: Random House of Canada, 1960.

Geisel, T.S. Hop on pop. Toronto: Random House of Canada, 1963.

Geisel, T.S. Horton hears a who. Toronto: Random House of Canada, 1964.

Geisel, T.S. The cat in the hat. Toronto: Random House of Canada, 1957.

McGinnes, J.A. (Ed.) Funny surprises. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1970.

McGinnes, J.A. (Ed.) Kittens and bears. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1970.

McGinnes, J.A. (Ed.) Magic and make-believe. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1964.

McGinnes, J.A. (Ed.) Mr. Whiskers. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1970.

McGinnes, J.A. (Ed.) Pets and puppets. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1970.

McGinnes, J.A. (Ed.) The toy box. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1970.

McGinnes, J.A. (Ed.) Treats and treasures. Don Mills, Ontario: Thomas Nelson & Sons (Canada) Ltd., 1964.

Ousley, O., and Russell, D.H. My little blue story book. Toronto: Ginn and Co., 1957.

Ousley, O., and Russell, D.H. My little green story book. Toronto: Ginn and Co., 1957.

Ousley, O., and Russell, D.H. My little red story book. Toronto: Ginn and Co., 1957.

Ousley, O., and Russell, D.H. On cherry street. Toronto: Ginn and Co., 1957.

Ousley, O., and Russell, D.H. The little white house. Toronto: Ginn and Co., 1957.

Russell, D.H., and Ousley, O. Around the corner. Toronto: Ginn and Co., 1957.

Russell, D.H., and Ousley, O. We are neighbours. Toronto: Ginn and Co., 1957.

Russell, D.H., and Wulfing, G. Friends far and near. Toronto: Ginn and Co., 1957.

Russell, D.H., Wulfing, G., and Ousley, O. Finding new neighbours. Toronto: Ginn and Co., 1957.

APPENDIX A

THE EXPERIMENTAL PASSAGES

FIRST READER, PASSAGE ONE, VERSION I

"We are ready to go now," said Mr. Wonderful.
"Get in the school bus."

Just then the children saw a balloon man.
"Here are balloons!" called the balloon man.
He had red balloons and blue balloons.
The children ran to get balloons as fast as they could run.

"I want a red balloon," said one little girl.
"Red is the color I like best."

Then the children ran and the children jumped on the bus.
Away went the big yellow bus.
Then the school bus went up, up, up.
It went up over the trees and the houses.
"What can I do?" said Mr. Wonderful.

"I think that I know what to do," said one of the children.
"We can help make the bus come down.
We can pop the balloons."

Then pop, pop, pop went the balloons!
Pop! went the big blue balloons and the big red balloons.
All of the children who were in the bus did get home to dinner.

FIRST READER, PASSAGE ONE, VERSION II

"We are ready to go now," said Mr. Wonderful.
"You get in the school bus."

Just then the children saw a balloon man.
"Balloons!" called the balloon man.
He had red balloons and he had blue balloons.
The children ran to get balloons as fast as they could.

"I want a red balloon," said one little girl.
"Red is the color that I like best."

Then the children ran and jumped on the bus.
Away went the big yellow bus.
Then the school bus went up, up, up.
It went up over the trees and it went up over the houses.
"What can I do?" said Mr. Wonderful.

"I think I know what to do," said one of the children.
"We can help to make the bus come down.
We can pop the balloons."

Then pop, pop, pop!
Pop! went the big blue balloons and pop! went the big red balloons.
All of the children in the bus did get home to dinner.

FIRST READER, PASSAGE TWO, VERSION I

"Betty!" called Mother.
"Put on your red dress now."

"This is the dress that I like," said Betty.

Mother said, "I want something at the store.
Here is the money.
I want some apples and I want some eggs."

"Mother wants apples and eggs," said Betty.
"Will you help me to get them, Susan?"

Betty and Susan ran to Mr. Mac's store.
They ran as fast as they could run.
Then they ran home again.

Down went Betty.
Bump! Bump!
Betty jumped up and Betty looked.
Nothing but apples on the walk.
The eggs were not there.

"I think that they are at Mr. Mac's store," she said.
And they were.

FIRST READER, PASSAGE TWO, VERSION II

"Betty!" called Mother.
"You put on your red dress now."

"This is the dress I like," said Betty.

Mother said, "I want something that is at the store.
Here is the money.
I want some apples and eggs."

"Mother wants apples and Mother wants eggs," said Betty.
"Will you help me get them, Susan?"

Betty ran to Mr. Mac's store and Susan ran to Mr. Mac's store.
They ran as fast as they could.
Then they ran home again.

Down went Betty.
Bump! Bump! went Betty.
Betty jumped up and looked.
Nothing but apples was on the walk.
The eggs were not there.

"I think they are at Mr. Mac's store," she said.
And they were.

FIRST READER, PASSAGE THREE, VERSION I

"I cannot find my Bunny," said Susan.
"I think my Bunny is lost."

"Tom! Betty!" called Mother.
"Will you please help Susan to find her Bunny?"

Betty and Tom ran to the toy box.
They ran as fast as they could run.
Tom took out his big airplane.
Zoom! Zoom!

They looked at the toy monkey and they looked at the toy mouse.
They looked at all the toys in the toy box.
"I see her little farm wagon and I see her little toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something Susan likes," he said.
"You look in this box."

"Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came and Susan looked in the box.
She was happy to see Bunny.

FIRST READER, PASSAGE THREE, VERSION II

"I cannot find my Bunny," said Susan.
"I think that my Bunny is lost."

"Tom! Betty!" called Mother.
"Will you please help Susan find her Bunny?"

Betty ran to the toy box and Tom ran to the toy box.
They ran as fast as they could.
Tom took out his big airplane.
Zoom! Zoom! went the airplane.

They looked at the toy monkey and the toy mouse.
They looked at all the toys that were in the toy box.
"I see her little farm wagon and her little toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something that Susan likes," he said.
"Look in this box."

"Here is Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came and looked in the box.
She was happy to see Bunny.

FIRST READER, PASSAGE FOUR, VERSION I

One day a little old woman made a pancake.
The pancake jumped out of the pan.
"I will help you catch that pancake," said the little old man.
The old man ran after the pancake and the old woman ran after the pancake.
The pancake called back, "You run as fast as you can.
You cannot catch me."

Pancake Man rolled on and Pancake Man rolled on.
On down a hill.
A dog that was at the foot of the hill saw the pancake.
"A pancake!" said the dog.
"This is something that I want for my dinner."
The dog ran after the pancake but could not catch it.

Then Pancake Man met a fox.
He sang, "I ran away from a little old woman and I ran away from a little old man.
I know I can run away from you, too."

The fox said, "I do not want to run after you.
You sing for me again."
Pancake Man sat by the fox.
And the fox ate him up.

FIRST READER, PASSAGE FOUR, VERSION II

One day a little old woman made a pancake.
The pancake jumped out of the pan.
"I will help you to catch that pancake," said the little old man.
The old man and the old woman ran after the pancake.
The pancake called back, "You run as fast as you can run.

You cannot catch me."

Pancake Man rolled on and on.
On down a hill went Pancake Man.
A dog at the foot of the hill saw the pancake.
"There is a pancake!" said the dog.
"This is something I want for my dinner."
The dog ran after the pancake but the dog could not catch it.

Then Pancake Man met a fox.
He sang, "I ran away from a little old woman and a little old man.
I know that I can run away from you, too."

The fox said, "I do not want to run after you.
Sing for me again."
Pancake Man sat by the fox.
And the fox ate him up.

FIRST READER, PASSAGE FIVE, VERSION I

Betty and Nan ran up the street.
Soon they met Dick and they met Tom.
Buttons, Dick's little pet dog, was with the boys.

"You come with us," said Nan.
"We are going to look in the toy store window."

"Look at the toy cake," said Betty.
"I like to help Mother make cakes."

"There is a toy airplane," said Dick.
"A toy airplane is in the store window.
It can go faster than the train."

Buttons ran into the store and Buttons jumped up in the window.
The children did not know he was gone.
He ran over to a little bear and he ran over to a red ball.
"Bow-wow! Bow-wow!"

The children saw Buttons in the window.
"Look," said Nan.
"Buttons sees something that he wants."

FIRST READER, PASSAGE FIVE, VERSION II

Betty ran up the street and Nan ran up the street.
Soon they met Dick and Tom.
Buttons, who was Dick's little pet dog, was with the boys.

"Come with us," said Nan.
"We are going to look in the toy store window."

"Look at the toy cake," said Betty.
"I like to help Mother to make cakes."

"There is a toy airplane," said Dick.
"A toy airplane in the store window.
It can go faster than the train can go."

Buttons ran into the store and jumped up in the window.
The children did not know that he was gone.
He ran over to a little bear and a red ball.
"Bow-wow! Bow-wow! said Buttons.

The children saw Buttons in the window.
"Look," said Nan.
"Buttons sees something he wants."

FIRST READER, PASSAGE SIX, VERSION I

"Let's go to the barn," said Betty.
"I want to see the turkeys and the new rooster."

"I hear something," said Tom.
"Can you help me to find that big noise?"

Then out of the barn came the big noise.
"I see something big," called Tom.
"Uncle Fred has a new tractor."

"Yes," said Aunt Mary.
"Uncle Fred's tractor is the noise that you hear.
He must get the farm ready and plant wheat."

Betty said, "The tractor is as big as the street sprinkler is.
The street sprinkler on Cherry Street."

Away went Uncle Fred on the big new tractor.
Down and back! went the tractor.
Soon Uncle Fred said, "It is time for dinner now.
I think Aunt Mary has ice cream for dinner."

"You come on, Susan," said Betty.
Away went Susan and Betty.
Tom looked at Pony and Tom laughed.
"Pony has come for me," he said.

FIRST READER, PASSAGE SIX, VERSION II

"Let's go to the barn," said Betty.
"I want to see the turkeys and I want to see the new rooster."

"I hear something," said Tom.
"Can you help me find that big noise?"

Then out of the barn came the big noise.
"I see something that is big," called Tom.
"Uncle Fred has a new tractor."

"Yes," said Aunt Mary.
"Uncle Fred's tractor is the noise you hear.
He must get the farm ready and he must plant wheat."

Betty said, "The tractor is as big as the street sprinkler.
The street sprinkler is on Cherry Street."

Away went Uncle Fred on the big tractor.
Down and back!
Soon Uncle Fred said, "It is time for dinner now.
I think that Aunt Mary has ice cream for dinner."

"Come on, Susan," said Betty.
Away went Susan and away went Betty.
Tom looked at Pony and laughed.
"Pony has come for me," he said.

FIRST READER, PASSAGE SEVEN, VERSION I

"Let's make little cakes," said Betty.
"Then we can have a party.
A birthday party for Bunny."

"I will run and I will bring some water," said Susan.
"I want to help make the birthday cakes."
"We do not have candles," said Betty.
"But this corn will look like little yellow candles look."

"I like the cakes we made," said Susan.
"Let's take Bunny for a walk in the garden."

White Hen came by with her chicks.
"Cluck! Cluck!" said White Hen.
Red Hen and Black Hen came by.
They ate and they ate.
Soon all of the corn on the little cakes was gone.

"You look at the little cakes!" said Susan.

"Where is the corn?"

"I think hens like corn cakes," said Betty.
"We were going to have a party for Bunny.
But we had a party for three hens and we had a party for some little yellow chicks."

FIRST READER, PASSAGE SEVEN, VERSION II

"Let's make little cakes," said Betty.
"Then we can have a party.
A birthday party is for Bunny."

"I will run and bring some water," said Susan.
"I want to help to make the birthday cakes."
"We do not have candles," said Betty.
"But this corn will look like little yellow candles."

"I like the cakes that we made," said Susan.
"Let's take Bunny for a walk in the garden."

White Hen came by with her chicks.
"Cluck! Cluck!"
Red Hen came by and Black Hen came by.
They ate and ate.
Soon all of the corn that was on the little cakes was gone.

"Look at the little cakes!" said Susan.
"Where is the corn?"

"I think that hens like corn cakes," said Betty.
"We were going to have a party for Bunny.
But we had a party for three hens and some little yellow chicks."

FIRST READER, PASSAGE EIGHT, VERSION I

One day Mother Rabbit called, "Will you help me take this cabbage to Aunt Rabbit?"
"Yes, Mother," said Billy Rabbit.
"May I ride my new bicycle?"

"Do you think that you can ride your bicycle up that big hill?" said Mother Rabbit.
"I think that I can," said Billy Rabbit.
Then he took the cabbage and got on his bicycle.

A frog that was by the brook saw Billy Rabbit.
"That is a big hill," said the frog.
"A big, big hill."

Up went Billy and up went his bicycle.
Little by little.
Billy worked as hard as he could work.
Soon he was over the hill.

Aunt Rabbit was happy to see Billy Rabbit and his new bicycle.
"You stay to dinner, Billy," she said.
"I have something you will like.
We will have cabbage and we will have wheat cakes with honey."

FIRST READER, PASSAGE EIGHT, VERSION II

One day Mother Rabbit called, "Will you help me to take this cabbage to Aunt Rabbit?"
"Yes, Mother," said Billy Rabbit.
"May I ride my new bicycle?"

"Do you think that you can ride your bicycle up that big hill?" said Mother Rabbit.
"I think I can," said Billy Rabbit.
Then he took the cabbage and he got on his bicycle.

A frog by the brook saw Billy Rabbit.
"That is a big hill," said the frog.
"It is a big, big hill."

Up went Billy and his bicycle.
Little by little Billy went.
Billy worked as hard as he could.
Soon he was over the hill.

Aunt Rabbit was happy to see Billy Rabbit and Aunt Rabbit was happy to see his new bicycle.
"Stay to dinner, Billy," she said.
"I have something that you will like.
We will have cabbage and wheat cakes with honey."

SECOND READER, PASSAGE ONE, VERSION I

One morning Ben and Mary Ann ran to Father. "We are building a store at school," said Ben. "Can you help us to find some boxes, please?"

"I think there are some empty boxes in the basement," said Father. "You take as many as you want."

The children put some boxes on Ben's express wagon, and went up the street to school.

The man who was in the shoe store called to them, "Do you want some more boxes?"

"We want all the boxes we can get," said Ben.

Mr. Tony was the peanut man. He had a sign which said, "Popcorn and peanuts are warm and brown." He put a yellow box in the wagon.

"Thank you," called Ben. Then the children went around the block and on to school.

At school Mary Ann picked up the little yellow box. Rattle, rattle, rattle it went!

Ben said, "We can play store with these boxes and peanuts. Mr. Tony's peanuts are better than any other peanuts in town are."

SECOND READER, PASSAGE ONE, VERSION II

One morning Ben ran to Father and Mary Ann ran to Father. "We are building a store at school," said Ben. "Can you help us find some boxes, please?"

"I think that there are some empty boxes in the basement," said Father. "Take as many as you want."

The children put some boxes on Ben's express wagon, and they went up the street to school.

The man in the shoe store called to them, "Do you want some more boxes?"

"We want all the boxes that we can get," said Ben.

Mr. Tony was the peanut man. He had a sign which said, "Popcorn and peanuts, warm and brown." He put a yellow box in the wagon.

"Thank you," called Ben. Then the children went around the block and they went on to school.

At school Mary Ann picked up the little yellow box. Rattle, rattle, rattle!

Ben said, "We can play store with these boxes and we can play store with these peanuts. Mr. Tony's peanuts are better than any other peanuts in town."

SECOND READER, PASSAGE TWO, VERSION I

The day of the birthday party came. Mary Ann put on her new blue dress and her new blue shoes. Ben got dressed for the party and Joe got dressed for the party, too.

"Run to the window," called Mother. "Your friends will be here soon."

"That look like the bus looks now," said Joe.

Mary Ann opened the door of the apartment and looked out. She saw five of her friends get off the elevator.

"Come in and see Sonny Bear dance," called Ben.

The children watched Sonny Bear dance and they watched him jump. Then they all helped Mary Ann eat the birthday cake!

After the party Mary Ann took some birthday cake out to Bill who was the elevator man.

"I thought something was happening up here today," he said. "Now I have a surprise for you. We will take a ride all the way to the basement." Then the elevator began to go down. Down to the basement it went. "We have some new neighbours," said Bill.

"Mrs. Tabby cat with five kittens!" said Mary Ann. "I like the fine sign that Bill has put on the box!"

SECOND READER, PASSAGE TWO, VERSION II

The day of the birthday party came. Mary Ann put on her new blue dress and she put on her new blue shoes. Ben and Joe got dressed for the party, too.

"You run to the window," called Mother. "Your friends will be here soon."

"That looks like the bus now," said Joe.

Mary Ann opened the door of the apartment and she looked out. She saw five of her friends get off the elevator.

"Come in and see Sonny Bear dance," called Ben.

The children watched Sonny Bear dance and jump. Then they all helped Mary Ann to eat the birthday cake!

After the party Mary Ann took some birthday cake out to Bill, the elevator man.

"I thought that something was happening up here today," he said. "Now I have a surprise for you. We will take a ride all the way to the basement." Then the elevator began to go down. Down to the basement. "We have some new neighbours," said Bill.

"There is Mrs. Tabby cat with five kittens!" said Mary Ann. "I like the fine sign Bill has put on the box!"

SECOND READER, PASSAGE THREE, VERSION I

Three circus clowns were dressing in a small tent. They were looking in their big boxes for trick hats and funny shoes. The three clowns wanted to look as funny as they could look for the big circus.

The tall clown had a policeman suit and green hair. He got into his old car. Away he went into the big tent.

The big clown had a trick hat. "This is the funniest hat that I have," said the big clown. "I think the children will like it." The hat had a little bell on the top. Tinkle! Tinkle! went the bell. The big clown went out with Billy, his trick goat.

The little clown was dressing too. He painted his face white and he put a big red dot on his nose. Into the circus tent he went.

Mary and Ben were in the big circus tent.

"There are the clowns!" called Mary. "The clowns are coming this way."

"I see the clown who helped me find my ticket," said Ben.

"He sees you too, Ben," said Father. "You look at him wave."

SECOND READER, PASSAGE THREE, VERSION II

Three circus clowns were dressing in a small tent. They were looking in their big boxes for trick hats and they were looking in their big boxes for funny shoes. The three clowns wanted to look as funny as they could for the big circus.

The tall clown had a policeman suit and he had green hair. He got into his old car. Away he went into the big tent.

The big clown had a trick hat. "This is the funniest hat I have," said the big clown. "I think that the children will like it." The hat had a little bell on the top. Tinkle! Tinkle! The big clown went out with Billy who was his trick goat.

The little clown was dressing too. He painted his face white and put a big red dot on his nose. Into the circus tent he went.

Mary was in the big circus tent and Ben was in the big circus tent.

"The clowns!" called Mary. "The clowns are coming this way."

"I see the clown who helped me to find my ticket," said Ben.

"He sees you too, Ben," said Father. "Look at him wave."

SECOND READER, PASSAGE FOUR, VERSION I

"Mother!" Ben called. "Guess where I'm going. Father is going to take me to the ball game. The game is at the ball park."

"I'm glad you can go," said Mother.

"Yes," said Ben. "We are going on Saturday."

The days went by. Then one morning Ben said, "This is the day that I'm going to the big game."

"I will help you get ready," said Mother. She brought Ben his hat and she brought him his baseball glove.

Away Ben and Father went to the ball park. They soon found their places and they sat down.

All the people were talking and laughing. Ben's father was talking as loud as anyone was talking

All at once there was the loud pop of a ball. Everybody watched the ball go high into the air. Up, up, up! Then the ball began to come down. Thump it went into Ben's baseball glove.

The people who were around Ben called, "Good catch, boy!"

SECOND READER, PASSAGE FOUR, VERSION II

"Mother!" Ben called. "You guess where I'm going. Father is going to take me to the ball game. The game at the ball park."

"I'm glad that you can go," said Mother.

"Yes," said Ben. "We are going on Saturday."

The days went by. Then one morning Ben said, "This is the day I'm going to the big game."

"I will help you to get ready," said Mother. She brought Ben his hat and baseball glove.

Away Ben went to the ball park and away Father went to the ball park. They soon found their places and sat down.

All the people were talking and they were laughing. Ben's father was talking as loud as anyone.

All at once there was the loud pop of a ball. Everybody watched the ball go high into the air. Up, up, up it went! Then the ball began to come down. Thump it went into Ben's baseball glove.

The people around Ben called, "Good catch, boy."

SECOND READER, PASSAGE FIVE, VERSION I

"Some of the children at school have gardens," thought Abel. "I will have one, too." He picked up cans and he picked up sticks. Then he took the shovel and began to dig.

Mr. Gates looked out of his window. "You cannot have a garden without corn," he said.

Abel knew how to plant beans, but he did not know how to plant corn. "Can you help me plant my corn?" he asked.

Mr. Gates told him just what to do. "You put four seeds in each hill," he said. "I suppose you have heard the old rhyme?

One is for the squirrel,
One is for the crow,
One is for the chicks,
And one is to grow."

Mr. Gates' rhyme could not have been right. The squirrels and the chicks did not get this corn. How it did grow! It grew right up under Mr. Gates' window.

Mr. Gates said, "This is about the best corn I ever saw. It is as pretty as a picture is."

SECOND READER, PASSAGE FIVE, VERSION II

"Some of the children who are at school have gardens," thought Abel. "I will have one, too." He picked up cans and sticks. Then he took the shovel and he began to dig.

Mr. Gates looked out of his window. "You cannot have a garden without corn," he said.

Abel knew how to plant beans, but not corn. "Can you help me to plant my corn?" he asked.

Mr. Gates told him just what to do. "Put four seeds in each hill," he said. "I suppose that you have heard the old rhyme?

One is for the squirrel,
One is for the crow,
One is for the chicks,
And one to grow."

Mr. Gates' rhyme could not have been right. The squirrels did not get this corn and the chicks did not get this corn. How it did grow! Right up under Mr. Gates' window.

Mr. Gates said, "This is about the best corn that I ever saw. It is as pretty as a picture."

SECOND READER, PASSAGE SIX, VERSION I

Up flew the big airplane.

"Just the same old trip," said the pilot. "There is the same train that we always see on the track here."

"There are the piles of lumber at the lumber mill and by the loading station," said the co-pilot.

The pilot knew all of the big farms which were along the way. What is that by the farmhouse? It looks like smoke looks."

The airplane turned and flew over the farmhouse. Roar! Roar! it went.

"I don't see a fire engine," said the co-pilot. "I don't think the farmer knows that his barn is burning."

Around the airplane went once again. It flew low and it flew straight ahead. The farmer and his wife heard the noise.

Soon the pilot saw two big engines come up the road. He watched the fire engines help to put out the fire.

SECOND READER, PASSAGE SIX, VERSION II

Up flew the big airplane.

"This is just the same old trip," said the pilot. "There is the same train we always see on the track here."

"There are the piles of lumber at the lumber mill and there are the piles of lumber by the loading station," said the co-pilot.

The pilot knew all of the big farms along the way.

All at once the co-pilot said, "You look down there! What is that by the farmhouse? It looks like smoke."

The airplane turned and it flew over the farmhouse. Roar! Roar!

"I don't see a fire engine," said the co-pilot. "I don't think that the farmer knows that his barn is burning."

Around the airplane went once again. It flew low and straight ahead. The farmer heard the noise and his wife heard the noise.

Soon the pilot saw two big fire engines come up the road. He watched the fire engines help put out the fire.

SECOND READER, PASSAGE SEVEN, VERSION I

Far away in the big woods was a little pond. The animals thought the little pond was beautiful.

A mother duck quacked to her baby ducks who were near the shore. A black bear came to the pond to drink and to catch fish. The birds liked the little pond and the raccoons liked the little pond, too.

One summer there was no rain for many days. The grass the rabbit liked to eat turned brown.

The duck said, "Far away through the trees, there is a big lake which has more water than our little pond has. I will help you to find it. You follow me."

All the animals followed. On through the hot dry woods. All at once they heard a loud noise overhead.

"I have found it," quacked the duck. "I saw green grass and I saw flowers there."

For many days the animals stayed by the big lake. Then one day it rained and they started back to the little pond. The duck went ahead and showed the others the way. The animals did not think the trip was a long one this time.

SECOND READER, PASSAGE SEVEN, VERSION II

Far away in the big woods was a little pond. The animals thought that the little pond was beautiful.

A mother duck quacked to her baby ducks near the shore. A black bear came to the pond to drink and he came to the pond to catch fish. The birds and the raccoons liked the little pond, too.

One summer there was no rain for many days. The grass which the rabbit liked to eat turned brown.

The duck said, "Far away through the trees, there is a big lake which has more water than our little pond. I will help you to find it. Follow me."

All the animals followed. On through the hot dry woods they went. All at once they heard a loud noise overhead.

"I have found it," quacked the duck. "I saw green grass and flowers there."

For many days the animals stayed by the big lake. Then one day it rained and they started back to the little pond. The duck went ahead and she showed the others the way. The animals did not think the trip a long one this time.

SECOND READER, PASSAGE EIGHT, VERSION I

Every morning all the animals in the woods went to school. That is, they all went but Timothy Bear.

One day Timothy saw something in his mailbox, but he did not know how to read.

Soon Billy Bunny came down the road and Betty Bunny came down the road. Hoppity-hop! Hoppity-hop! Billy was helping Betty to carry a big bowl of cabbage salad.

The five squirrel brothers brought an apple pie and a basket of nuts. More animals came by and each one had a covered basket.

Timothy followed them and he peeked around a tree. A picnic! It was the most wonderful picnic that he had ever seen. Timothy began to cry.

Mac Mouse saw Timothy. "Come to the picnic," he called. "The postman put a letter about the picnic in your mailbox."

Just then Mother Bear came down the road with a ginger cake and she came down the road with Timothy's letter. "Now you can see it is always good to know how to read," she said.

The very next day Timothy went to school. Before long he could read as well as anyone in the woods could read.

SECOND READER, PASSAGE EIGHT, VERSION II

Every morning all the animals who were in the woods went to school. That is, they all went but Timothy Bear.

One day Timothy saw something in his mailbox, but he did not know how to read.

Soon Billy Bunny and Betty Bunny came down the road. Hoppity-hop! Hoppity-hop! they went. Billy was helping Betty carry a big bowl of cabbage salad.

The five squirrel brothers brought an apple pie and they brought a basket of nuts. More animals came by and each one had a covered basket.

Timothy followed them and peeked around a tree. It was a picnic! It was the most wonderful picnic he had ever seen. Timothy began to cry.

Mac Mouse saw Timothy. "You come to the picnic," he called. "The postman put a letter about the picnic in your mailbox."

Just then Mother Bear came down the road with a ginger cake and Timothy's letter. "Now you can see that it is always good to know how to read," she said.

The very next day Timothy went to school. Before long he could read as well as anyone in the woods.

APPENDIX B

DIRECTIONS FOR ADMINISTERING THE RESEARCH INSTRUMENTS

ORAL READING

Word Lists

Say: "I want to find out how many words you know and to do this I am going to have you read the words on this list (present list) out loud to me. If you come to a word you don't know, leave it and go on to the next one. Begin reading here (point) and read down each list."

Beside each word read correctly, mark a check. If the child spontaneously corrects an error, write his error beside the word and put a check mark after it. If he cannot get a word, do not tell him what it is. Instead simply say: "If you can't get that word just leave it and go on to the next one." If the child omits a word, cross it out.

Stories

Say: "Now I would like to have you read a story out loud for me. Begin reading here (point) and read the story as well as you can to the end." If the child does not get a word after looking at it for five seconds without an audible effort, tell him what the word is. If he skips a line, stop him and point to the beginning of the line he skipped. Say: "You missed this line. Read it for me please."

CLOZE TESTS

If the child has already done the recoverability cloze test, say: "This is something like what you did for me before, but this time you can put only one word in each space."

If the child has not already done the cloze recoverability test, say: "I have taken some stories from a grade one/two reader and I have left some of the words out. I want to see if you can tell me what word should go in each of the spaces."

Grade One

Sample: Read: "Go fast, Flip," (pause and point to the space) Tom." Then say: "What word can go in this space (point)?" If the child responds correctly, proceed. If the child responds incorrectly, read the sentence with the word the child has suggested and say: "Does that word sound right?" If the child says yes, say: "Not quite. The word said can go in this space to make the sentence "Go fast, Flip," said Tom. If the child says no, say: "The word said can go in this space to make the sentence "Go fast, Flip," said Tom. Proceed with the next sentence. If the child does not respond after approximately 15 seconds ask: "Do you have any idea what word could go in this space?" If no say: "This is a practice one so I will help you." Then continue as above.

"Go fast, Flip," ______ Tom.
"Run fast, Pony.
______ can play cowboy."

Flip ______ Pony did go fast.
______ Cowboy Tom went fast.
______ went Tom for a ______.

Test: Say: "Now I want you to tell me what word goes in each space on this page (present page). You may either read the sentence to yourself and then tell me what word should go in each space; or you can read the sentence out loud putting in the word that you think should go in the space." Record the child's response for each item on the answer form.

If the child does not respond after approximately 15 seconds ask: "Do you have any idea what word could go in this space?" If not, say: "That's fine, leave that one and go on to the next one."

If the child responds with more than one word at any point in the test, say: "You can only put one word in each space."

Subsequent tests: If the child has already completed one normal cloze test, do not repeat the sample items before beginning a subsequent test. Say: "This is another story with some of the words left out. Let's see if you can tell me what words can go in each of the spaces. Remember to put only one word in each space."

Grade Two

Sample: Read the first two sentences and have the children orally complete the blanks. Then have them print one word in each blank in the remainder of the sample passage.

One day Patsy and ______ mother went into
the ______ paper store. They wanted ______
pick out wall paper ______ Patsy's room.
"Look, Mother!" ______ Patsy. "See all the
______ of wall paper! At ______ I liked this
green ______ best of all. Now ______ like
the yellow paper ______ the flowers better."

Test: Say: "Print one word in each blank on this page. If you need help to spell a word, put up your hand and I will help you."

MULTIPLE CHOICE RECOVERABILITY TESTS

Sample: Say: "This is a practice item. There are four sentences-- three below the line (point) and one above the line (point). One of these sentences below the line means the same thing as the one above the line, and two of them mean something different. I want you to pick out the sentence down here (point) that means the same thing as this one (point). This time I'm going to read to you."

Read the four sentences to the child. Then say: "Point to the sentence that means the same thing as the one above the line." If the child points correctly, go on to the test.

If the child does not point correctly say: "Let's try them." Read the sentence above the line and then the one the child has chosen. Say: "Do these sentences mean the same thing?" If the child says yes, point out how the two sentences are different. If he says no, say: "Let's try this one." Read the sentence above the line and the next one below the line. Ask: "Do these mean the same thing?" Continue until the child locates the correct sentence. Go on to sample two and repeat the above procedure. Even if the child does not respond correctly to sample two, go on to the test.

Grade One - Tom can run and jump.

Tom can run and Betty can jump.
Tom can run and Tom can jump.
Tom can run and work.

Flip and Pony did go fast.

Flip did go fast and Pony sat down.
Flip and Tom did go fast.
Flip did go fast and Pony did go fast.

Grade Two - The fly sat on his nose and then on his ear.

The fly sat on his nose and then the bee sat on his ear.
The fly sat on his nose and then it sat on his ear.
The fly sat on his head and then on his ear.

"Here they are," said Mr. Green
"Two tractors and two cowboys."

"Here are two tractors and two cowboys."
"Jack has two tractors and two cowboys."
"Two tractors and two trucks."

Tests: Give no further help. For each item, read the four sentences and record the child's response (1, 2 or 3). You may give encouragement by saying good, fine etc.

CLOZE RECOVERABILITY TESTS

If the child has already done a normal cloze test, say: "This is something like what you did for me before, but this time you can put more than one word in each space."

Grade One

Sample: Read the first sentence, then say: "If I don't put any words in this space (cover space with your fingers), the sentence will say: "I will go up and get the kitten." Now I want you to tell me what words can go in this space so the sentence you make will sound right and so it means the same thing as I will go up and get the kitten. What words do you think can go in this space?"

If the child responds correctly, go on to the test.

If the child responds will, say: "Yes, will could go in this space. You could even put in I will to make the sentence say I will go up and I will get the kitten. Do sample two.

If the child's response creates a sentence which sounds right but means something different than the original sentence, say: "Yes that sounds right, but I will go up and (insert child's response) get the kitten means something different than I will go up and get the kitten. If I put in the words I will, the sentence would say I will go up and I will get the kitten and that means the same thing as I will go up and get the kitten. Do sample two.

If the child says something which is neither grammatical or meaningful in the sentence, read the sentence with the words he has suggested inserted. Then ask: "Does that sound right?" Whether the child answers yes or no, say: "This is a practice item so I will help you. I am going to put in the words I will. Then the sentence will say I will go up and I will get the kitten, and that sentence means the same thing as I will go up and get the kitten. Do sample two.

If the child does not respond after approximately 15 seconds, say: "This is a practice item so I will help you. I am going to put in the words I will. Then the sentence will say I will go up and I will get the kitten and that sentence means the same thing as I will go up and get the kitten. Do sample two.

Sample two is presented the same way as sample one. Even if the child does not respond correctly to sample two, proceed with the test.

"Here I go up the tree," said Father.
"I will go up and ______ get the kitten."

"I have a big truck," said Tom.
"______ a big, red truck."

Grade Two

Sample: Use similar directions to those provided for grade one with the second-grade sample items.

The kitten looked under the trees and ______ along the brook.

"I have a big pocket in my dress," said Nan.
"______ a big, big pocket."

Tests

Read the test story to the child. When you come to a test sentence, follow under the words with your fingers and pause slightly when you come to the blank. Read it once more and ask the child: "What words can go in this space?" If the child responds, write his answer on the answer blank and proceed with the story. If the child does not respond after approximately 15 seconds ask: "Do you have any idea what word or words can go in this space?" If the child responds, record his response; if not, say: "Fine" and proceed with the story. Give encouragement.

APPENDIX C

COMPLETE TESTS FOR FIRST READER, PASSAGE THREE

WORD LIST

said
Betty
have
toy
all
Susan
could
to
something
please
here
Tom
you
lost
I
fast
little
in

it
is
find
the
that
see
Betty
came
went
ran
think
her
Zoom
looked
bus
will
as
run

he
wagon
were
farm
my
likes
box
at
help
this
and
look
they

VERSION I, ORAL READING

"I cannot find my Bunny," said Susan.
"I think my Bunny is lost."

"Tom! Betty!" called Mother.
"Will you please help Susan to find her Bunny?"

Betty and Tom ran to the toy box.
They ran as fast as they could run.
Tom took out his big airplane.
Zoom! Zoom!

They looked at the toy monkey and they looked at the toy mouse.
They looked at all the toys in the toy box.
"I see her little farm wagon and I see her little toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something Susan likes," he said.
"You look in this box."

"Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came and Susan looked in the box.
She was happy to see Bunny.

VERSION I, CLOZE 1

"I cannot find my Bunny," said Susan.
"I think my Bunny ______ lost."

"Tom! Betty!" called Mother.
"Will you please ______ Susan to find her ______?"

Betty and Tom ran ______ the toy box.
They ______ as fast as they ______ run.
Tom took out his big airplane.
Zoom! Zoom!

They ______ at the toy monkey ______ they looked at the ______ mouse.
They looked at ______ the toys in the ______ box.
"I see her ______ farm wagon and I ______ her little toy bus," ______
Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something ______ likes," he said.
"You ______ in this box."

"Bunny!" ______ Betty.
"Bunny was in Mr. Mac's store.

Susan came and ______ looked in the box.
She was happy to see Bunny.

VERSION I, CLOZE 2

"I cannot find my Bunny," said Susan.
"I think my ______ is lost."

"Tom! Betty!" called Mother.
"Will you ______ help Susan to find ______ Bunny?"

Betty and Tom ______ to the toy box.
______ ran as fast as ______ could run.
Tom took out his big airplane.
Zoom! Zoom!

______ looked at the toy ______ and they looked at ______ toy mouse.
They looked ______ all the toys in ______ toy box.
"I see ______ little farm wagon and ______ see her little toy ______ ,"
said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have ______ Susan likes," he said.

"______ look in this box."

"______!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came ______ Susan looked in the ______.
She was happy to see Bunny.

VERSION 1, CLOZE 3

"I cannot find my Bunny," said Susan.
"I think ______ Bunny is lost."

"Tom! Betty!" called Mother.
"Will ______ please help Susan to ______ her Bunny?"

Betty and ______ ran to the toy ______.
They ran as fast ______ they could run.
Tom took out his big airplane.
Zoom! ______!

They looked at the ______ monkey and they looked ______ the toy mouse.
They ______ at all the toys ______ the toy box.
"I ______ her little farm wagon ______ I see her little ______ bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I ______ something Susan likes," he ______.
"You look in this ______."

"Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan ______ and Susan looked in ______ box.
She was happy to see Bunny.

VERSION 1, CLOZE 4

"I cannot find my Bunny," said Susan.
"I ______ my Bunny is lost."

"Tom! Betty!" called Mother.
"______ you please help Susan ______ find her Bunny?"

Betty ______ Tom ran to the ______ box.
They ran as ______ as they could run.
Tom took out his big airplane.
______! Zoom!

They looked at ______ toy monkey and they ______ at the toy mouse.
______ looked at all the ______ in the toy box.
"______ see her little farm ______ and I see her ______ toy bus,"
said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"______ have something Susan likes," ______ said.
"You look in ______ box."

"Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

______ came and Susan looked ______ the box.
She was happy to see Bunny.

VERSION 1, CLOZE 5

"I cannot find my Bunny," said Susan.
"______ think my Bunny is ______."

"Tom! Betty!" called Mother.
"Will you please help ______ to find her Bunny?"

______ and Tom ran to ______ toy box.
They ran ______ fast as they could ______.
Tom took out his big airplane
Zoom! Zoom!

They looked ______ the toy monkey and ______ looked at the toy ______.
They looked at all ______ toys in the toy ______.
"I see her little ______ wagon and I see ______ little toy bus," said
______.
"But I do not see Bunny."

"Bunny!" said ______.
"Bunny was in Mr. Mac's store."

Susan came and Susan ______ in the box.
She was happy to see Bunny.

VERSION I, MULTIPLE CHOICE RECOVERABILITY

1. I think my Bunny is lost

   I think my Bunny is here.
   I think when my Bunny is lost.
   I think that my Bunny is lost.

2. Betty and Tom ran to the toy box.

   Betty ran to the toy box and Tom ran to the toy box.
   Betty ran to the toy box and Tom went to school.
   Betty and Tom ran to the toy store.

3. Tom took out his big airplane.
   Zoom! Zoom!

   Zoom! Zoom! went the truck.
   Zoom! Zoom! went the airplane.
   Zoom! Roar!

4. They looked at all the toys in the toy box.

   They looked at all the balls in the toy box.
   They looked at all the toys that were in the toy box.
   They looked at all the toys Susan had in the toy box.

5. "I have something Susan likes," he said.

   "I have something that Susan likes," he said.
   "I see something Susan likes," he said.
   "I have something when Susan likes," he said.

6. "You look in the box."
   "Bunny!" said Betty.

   "I like Bunny!" said Betty.
   "Bunny!" said Susan.
   "There is Bunny!" said Betty.

VERSION I, CLOZE RECOVERABILITY

"I cannot find my Bunny," said Susan.
"I think __________ my Bunny is lost."

"Tom! Betty!" called Mother.
"Will you please help Susan to find her Bunny?"

Betty ran to the toy box and Tom __________.
They ran as fast as they could run.
Tom took out his big airplane.
Zoom! Zoom! __________.

They looked at the toy monkey and they looked at the toy mouse.
They looked at all the toys __________ in the toy box.
"I see her little farm wagon and I see her little toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something __________ Susan likes," he said.
"You look in this box."

"__________ Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came and Susan looked in the box.
She was happy to see Bunny.

VERSION II, ORAL READING

"I cannot find my Bunny," said Susan.
"I think that my Bunny is lost."

"Tom! Betty!" called Mother.
"Will you please help Susan find her Bunny?"

Betty ran to the toy box and Tom ran to the toy box.
They ran as fast as they could.
Tom took out his big airplane.
Zoom! Zoom! went the airplane.

They looked at the toy monkey and the toy mouse.
They looked at all the toys that were in the toy box.
"I see her little farm wagon and her little toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something that Susan likes," he said.
"Look in this box."

"Here is Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came and looked in the box.
She was happy to see Bunny.

VERSION II, CLOZE 1

"I cannot find my Bunny," said Susan.
"I think that my ______ is lost."

"Tom! Betty!" called Mother.
"Will you ______ help Susan find her ______?"

Betty ran to the ______ box and Tom ran ______ the toy box.
They ______ as fast as they ______.
Tom took out his big airplane.
Zoom! Zoom! went the ______.

They looked at the ______ monkey and the toy ______.
They looked at all ______ toys that were in ______ toy box.
"I see ______ little farm wagon and ______ little toy bus," said ______.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something that ______ likes," he said.
"Look ______ this box."

"Here is ______!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came ______ looked in the box.
She was happy to see Bunny.

VERSION II, CLOZE 2

"I cannot find my Bunny," said Susan.
"I think that ______ Bunny is lost."

"Tom! Betty!" called Mother.
"Will ______ please help Susan find ______ Bunny?"

Betty ran to ______ toy box and Tom ______ to the toy box.
______ ran as fast as ______ could.
Tom took out his big airplane.
Zoom! Zoom! went ______ airplane.

They looked at ______ toy monkey and the ______ mouse.
They looked at ______ the toys that were ______ the toy box.
"I ______ her little farm wagon ______ her little toy bus," ______ Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something ______ Susan likes," he said.
"______ in this box."

"Here ______ Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan ______ and looked in the ______.
She was happy to see Bunny.

VERSION II, CLOZE 3

"I cannot find my Bunny," said Susan.
"I think ______ my Bunny is lost."

"Tom! Betty!" called Mother.
"______ you please help Susan ______ her Bunny?"

Betty ran ______ the toy box and ______ ran to the toy ______.
They ran as fast ______ they could.
Tom took out his big airplane.
Zoom! Zoom! ______ the airplane.

They looked ______ the toy monkey and ______ toy mouse.
They looked ______ all the toys that ______ in the toy box.
"______ see her little farm ______ and her little toy ______," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have ______ that Susan likes," he ______.
"Look in this box."

"______ is Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

______ came and looked in ______ box.
She was happy to see Bunny.

VERSION II, CLOZE 4

"I cannot find my Bunny," said Susan.
"I ______ that my Bunny is ______."

"Tom! Betty!" called Mother.
"Will you please help ______ find her Bunny?"

Betty ______ to the toy box ______ Tom ran to the ______ box.
They ran as ______ as they could.
Tom took out his big airplane.
Zoom! ______! went the airplane.

They ______ at the toy monkey ______ the toy mouse.
They ______ at all the toys ______ were in the toy ______.
"I see her little ______ wagon and her little ______ bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I ______ something that Susan likes," ______ said.
"Look in this ______."

"Here is Bunny!" said ______.
"Bunny was in Mr. Mac's store."

Susan came and looked ______ the box.
She was happy to see Bunny.

VERSION II, CLOZE 5

"I cannot find my Bunny," said Susan.
"______ think that my Bunny ______ lost."

"Tom! Betty!" called Mother.
"Will you please ______ Susan find her Bunny?"

______ ran to the toy ______ and Tom ran to ______ toy box.
They ran ______ fast as they could.
Tom took out his big airplane.
______! Zoom! went the airplane.

______ looked at the toy ______ and the toy mouse.
______ looked at all the ______ that were in the ______ box.
"I see her ______ farm wagon and her ______ toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"______ have something that Susan ______," he said.
"Look in ______ box."

"Here is Bunny!" ______ Betty.
"Bunny was in Mr. Mac's store."

Susan came and ______ in the box.
She was happy to see Bunny.

VERSION II, MULTIPLE CHOICE RECOVERABILITY

1. Will you please help Susan find her Bunny?

   Will you please help Susan to find her Bunny?
   Will you please help Susan find her wagon?
   Will you please help Susan slowly find her Bunny?

2. They ran as fast as they could.

   They ran as fast as they could to school.
   The boys ran as fast as they could.
   They ran as fast as they could run.

3. "I see her little farm wagon and her little toy bus," said Tom.

"I see her little farm wagon and I have her little toy bus," said Tom.
"I see her little farm wagon and her little toy car," said Tom.
"I see her little farm wagon and I see her little toy bus," said Tom.

4. They looked at the toy monkey and the toy mouse.

They looked at the toy bear and the toy mouse.
They looked at the toy monkey and they looked at the toy mouse.
They looked at the toy monkey and they played with the toy mouse.

5. "I have something that Susan likes," he said.
"Look in this box."

"Look in this wagon."
"You look in this box."
"They look in this box."

6. Susan came and looked in the box.

Susan came and Betty looked in the box.
Susan came and looked in the wagon.
Susan came and Susan looked in the box.

VERSION II, CLOZE RECOVERABILITY

"I cannot find my Bunny," said Susan.
"I think that my Bunny is lost."

"Tom! Betty!" called Mother.
"Will you please help Susan __________ find her Bunny?"

Betty ran to the toy box and Tom ran to the toy box.
They ran as fast as they could __________.
Tom took out his big airplane.
Zoom! Zoom! went the airplane.

They looked at the toy monkey and __________ the toy mouse.
They looked at all the toys that were in the toy box.
"I see her little farm wagon and __________ her little toy bus," said Tom.
"But I do not see Bunny."

Just then Ben came to the house.
"I have something that Susan likes," he said.
"__________ look in this box."

"Here is Bunny!" said Betty.
"Bunny was in Mr. Mac's store."

Susan came and __________ looked in the box.
She was happy to see Bunny.

APPENDIX D

MULTIPLE CHOICE RECOVERABILITY TESTS

FIRST READER, PASSAGE ONE, VERSION I

1. "We are ready to go now," said Mr. Wonderful.
"Get in the school bus."

"Get in the blue bus."
"You get in the school bus."
"They get in the school bus."

2. He had red balloons and blue balloons.

He had red balloons and he had blue balloons.
He had red balloons and he saw blue balloons.
He had yellow balloons and blue balloons.

3. Red is the color I like best.

Red is the color today I like best.
Blue is the color I like best.
Red is the color that I like best.

4. It went up over the trees and the houses.

It went up over the trees and it went up over the houses.
It went up over the roads and over the houses.
It went up over the trees and it came down on the houses.

5. We can help make the bus come down.

We can help quickly make the bus come down.
We can help make the house come down.
We can help to make the bus come down.

6. Pop! went the big blue balloons and the big red balloons.

Pop! went the big yellow balloons and the big red balloons.
Pop! went the big blue balloons and pop! went the big red balloons.
Pop! went the big blue balloons and up! went the big red balloons.

FIRST READER, PASSAGE ONE, VERSION II

1. Just then the children saw a balloon man.
"Balloons!" called the balloon man.

"Here are balloons!" called the balloon man.
"Balloons!" called the big man.
"I want balloons!" called the balloon man.

2. The children ran to get balloons as fast as they could.

The children ran to get balloons as fast as they could race.
The children ran to get toys as fast as they could.
The children ran to get balloons as fast as they could run.

3. Then the children ran and jumped on the bus.

Then the children ran and the children jumped on the bus.
Then the children ran and the boy jumped on the bus.
Then the boy ran and jumped on the bus.

4. "I think I know what to do," said one of the children.

"I think I know what to do," said one of the boys.
"I think that I know what to do," said one of the children.
"I think and I know what to do," said one of the children.

5. "We can pop the balloons."
Then pop, pop, pop!

Then pop, pop, pop said the boy!
Then pop, pop, pop went the balloons!
Then pop, pop, bang!

6. All of the children in the bus did get home to dinner.

All of the children playing in the bus did get home to dinner.
All of the boys in the bus did get home to dinner.
All of the children who were in the bus did get home to dinner.

FIRST READER, PASSAGE TWO, VERSION I

1. "Betty!" called Mother.
"Put on your red dress now."

"You put on your red dress now."
"They put on your red dress now."
"Put on your red shoes now."

2. Mother said, "I want something at the store."

Mother said, "I see something at the store."
Mother said, "I want something I saw at the store."
Mother said, "I want something that is at the store."

3. "Mother wants apples and eggs," said Betty.

"Mother wants bread and eggs," said Betty.
"Mother wants apples and Mother wants eggs," said Betty.
"Mother wants apples and I see eggs," said Betty.

4. Betty and Susan ran to Mr. Mac's store.

Betty ran to Mr. Mac's store and Susan went to school.
Betty and Susan ran to Mr. Mac's house.
Betty ran to Mr. Mac's store and Susan ran to Mr. Mac's store.

5. Down went Betty.
Bump! Bump!

Bump! Clank!
Bump! Bump! went Betty.
Bump! Bump! said Tom.

6. Betty jumped up and Betty looked.
Nothing but apples on the walk.

Nothing but apples was on the walk.
Nothing but apples rolled on the walk.
Nothing but apples on the floor.

FIRST READER, PASSAGE TWO, VERSION II

1. "This is the dress I like," said Betty.

"This is the dress today I like," said Betty.
"This is the hat I like," said Betty.
"This is the dress that I like," said Betty.

2. I want some apples and eggs.

I want some apples and I want some eggs.
I want some apples and Betty has the eggs.
I want some apples and bread.

3. Will you help me get them, Susan?

Will you help me quickly get them, Susan?
Will you help me to get them, Susan?
Will you help me get them, Tom?

4. They ran as fast as they could.

The men ran as fast as they could.
They ran as fast as they could run.
They ran as fast as they could to school.

5. Betty jumped up and looked.

Betty jumped up and Betty looked.
Betty jumped up and down.
Betty jumped up and Susan looked.

6. "I think they are at Mr. Mac's store," she said.

"I think now they are at Mr. Mac's store," she said.
"I think they are at Mr. Mac's house," she said.
"I think that they are at Mr. Mac's store," she said.

FIRST READER, PASSAGE THREE, VERSION I

1. I think my Bunny is lost.

I think my Bunny is here.
I think when my Bunny is lost.
I think that my Bunny is lost.

2. Betty and Tom ran to the toy box.

Betty ran to the toy box and Tom ran to the toy box.
Betty ran to the toy box and Tom went to school.
Betty and Tom ran to the toy store.

3. Tom took out his big airplane.
Zoom! Zoom!

Zoom! Zoom! went the truck.
Zoom! Zoom! went the airplane.
Zoom! Roar!

4. They looked at all the toys in the toy box.

They looked at all the balls in the toy box.
They looked at all the toys that were in the toy box.
They looked at all the toys Susan had in the toy box.

5. "I have something Susan likes," he said.

"I have something that Susan likes," he said.
"I see something Susan likes," he said.
"I have something when Susan likes," he said.

6. "You look in the box."
"Bunny!" said Betty.

"I like Bunny!" said Betty.
"Bunny!" said Susan.
"There is Bunny!" said Betty.

FIRST READER, PASSAGE THREE, VERSION II

1. Will you please help Susan find her Bunny?

Will you please help Susan to find her Bunny?
Will you please help Susan find her wagon?
Will you please help Susan slowly find her Bunny?

2. They ran as fast as they could.

They ran as fast as they could to school.
The boys ran as fast as they could.
They ran as fast as they could run.

3. "I see her little farm wagon and her little toy bus," said Tom.

"I see her little farm wagon and I have her little toy bus," said Tom.
"I see her little farm wagon and her little toy car," said Tom.
"I see her little farm wagon and I see her little toy bus," said Tom.

4. They looked at the toy monkey and the toy mouse.

They looked at the toy bear and the toy mouse.
They looked at the toy monkey and they looked at the toy mouse.
They looked at the toy monkey and they played with the toy mouse.

5. "I have something that Susan likes," he said.
"Look in this box."

"Look in this wagon."
"You look in this box."
"They look in this box."

6. Susan came and looked in the box.

Susan came and Betty looked in the box.
Susan came and looked in the wagon.
Susan came and Susan looked in the box.

FIRST READER, PASSAGE FOUR, VERSION I

1. "I will help you catch that pancake," said the little old man.

"I will help you to catch that pancake," said the little old man.
"I will help you slowly catch that pancake," said the little old man.
"I will help you catch that pancake," said the little old woman.

2. The pancake called back, "You run as fast as you can."

The pancake called back, "You run as fast as you can down the road."
The pancake called back, "You run as fast as you can run."
The dog called back, "You run as fast as you can."

3. Pancake Man rolled on and Pancake Man rolled on.
On down a hill.

On down a hill went Pancake Man.
On down a road.
On down a hill said the dog.

4. A dog that was at the foot of the hill saw the pancake.
"A pancake!" said the dog.

"I like a pancake!" said the dog.
"A pancake!" said the bear.
"There is a pancake!" said the dog.

5. The dog ran after the pancake but could not catch it.

The bear ran after the pancake but could not catch it.
The dog ran after the pancake but the dog could not catch it.
The dog ran after the pancake but the bear could not catch it.

6. I know I can run away from you, too.

I know I can run away from Tom, too.
I know when I can run away from you, too.
I know that I can run away from you, too.

FIRST READER, PASSAGE FOUR, VERSION II

1. The old man and the old woman ran after the pancake.

The old man and the old dog ran after the pancake.

The old man ran after the pancake and the old woman ran after the pancake.

The old man ran after the pancake and the old woman went to the house.

2. Pancake Man rolled on and on.

Pancake Man rolled on and the dog ran on.
Pancake Man ran on and on.
Pancake Man rolled on and Pancake Man rolled on.

3. A dog at the foot of the hill saw the pancake.

A dog that was at the foot of the hill saw the pancake.
A dog playing at the foot of the hill saw the pancake.
A dog at the foot of the hill got the pancake.

4. This is something I want for my dinner.

This is something that I want for my dinner.
This is something I see for my dinner.
This is something good I want for my dinner.

5. He sang, "I ran away from a little old woman and a little old man."

He sang, "I ran away from a little old dog and a little old man."

He sang, "I ran away from a little old woman and I ran away from a little old man."

He sang, "I ran away from a little old woman and I saw a little old man."

6. The fox said, "I do not want to run after you.
Sing for me again."

Sing for me now.
They sing for me again.
You sing for me again.

FIRST READER, PASSAGE FIVE, VERSION I

1. Betty and Nan ran up the street.

Betty ran up the street and Nan ran up the street.
Betty and Nan rode up the street.
Betty ran up the street and Nan went to school.

2. Buttons, Dick's little pet dog, was with the boys.

Buttons, Dick's little black dog, was with the boys.
Buttons, and Dick's little pet dog, was with the boys.
Buttons, who was Dick's little pet dog, was with the boys.

3. I like to help Mother make cakes.

I like to help Mother to make cakes.
I like to help Mother quickly make cakes.
I like to help Mother eat cakes.

4. It can go faster than the train.

It can go faster than the truck.
It can go faster than the train to the farm.
It can go faster than the train can go.

5. The children did not know he was gone.

The children did not know when he was gone.
The children did not know that he was gone.
The children did not know he was there.

6. Buttons ran over to a little bear and Buttons ran over to a red ball.
"Bow-wow! Bow-wow!"

"Bow-wow! Bow-wow!" said Buttons.
"Bow-wow! Roar!"
"Bow-wow! Bow-wow!" said Tom.

FIRST READER, PASSAGE FIVE, VERSION II

1. Soon they met Dick and Tom.

Soon they met Dick and they met Tom.
Soon they saw Dick and Tom.
Soon they met Dick and they saw Tom.

2. Soon they met Dick and they met Tom.
"Come with us," said Nan.

"Come with us," said Betty.
"They come with us," said Nan.
"You come with us," said Nan.

3. "There is a toy airplane," said Dick.
"A toy airplane in the store window."

"A toy airplane is in the store window."
"A big airplane in the store window."
"A toy airplane flys in the store window."

4. Buttons ran into the store and jumped up in the window.

Buttons ran into the store and Buttons jumped up in the window.
Buttons ran into the house and jumped up in the window.
Buttons ran into the store and Dick jumped up in the window.

5. He ran over to a little bear and a red ball.

He ran over to a little dog and a red ball.
He ran over to a little bear and he saw a red ball.
He ran over to a little bear and he ran over to a red ball.

6. Buttons sees something he wants.

Buttons sees something red he wants.
Buttons sees something that he wants.
Buttons sees something he has.

FIRST READER, PASSAGE SIX, VERSION I

1. I want to see the turkeys and the new rooster.

I want to see the goat and the new rooster.
I want to see the turkeys and I want to see the new rooster.
I want to see the turkeys and Susan likes the new rooster.

2. "I see something big," said Tom.

"I see something that is big," said Tom.
"I see something too big," said Tom.
"I want something big," said Tom.

3. He must get the farm ready and plant wheat.

He must get the tractor ready and plant wheat.
He must get the farm ready and he must plant wheat.
He must get the farm ready and Tom will plant wheat.

4. Betty said, "The tractor is as big as the street sprinkler is.
The street sprinkler on Cherry Street.

The street sprinkler on Pine Street.
The street sprinkler works on Cherry Street.
The street sprinkler is on Cherry Street.

5. I think Aunt Mary has ice cream for dinner.

I think Aunt Mary has ice cream for breakfast.
I think when Aunt Mary has ice cream for dinner.
I think that Aunt Mary has ice cream for dinner.

6. Away went Susan and Betty.

Away went Susan and away went Betty.
Away went Tom and Betty.
Away went Susan and up went Betty.

FIRST READER, PASSAGE SIX, VERSION II

1. Can you help me find that big noise?

Can you help me make that big noise?
Can you help me quickly find that big noise?
Can you help me to find that big noise?

2. Uncle Fred's tractor is the noise you hear.

Uncle Fred's tractor is the noise that you hear.
Uncle Fred's truck is the noise you hear.
Uncle Fred's tractor is the noise roaring you hear.

3. Betty said, "The tractor is as big as the street sprinkler."

Betty said, "The tractor is as big as the street sprinkler on Cherry Street."
Betty said, "The tractor is as big as the street sprinkler is."
Betty said, "The truck is as big as the street sprinkler."

4. Away went Uncle Fred on the big tractor.
Down and back!

Up and back!
Down and back! went the tractor.
Down and back! said Uncle Fred.

5. "Come on, Susan," said Betty.

"They come on, Susan," said Betty.
"Come on, Susan," said Tom.
"You come on, Susan," said Betty.

6. Tom looked at Pony and laughed.

Tom looked at Pony and Pony laughed.
Tom looked at Pony and Tom laughed.
Tom looked at Pony and sang.

FIRST READER, PASSAGE SEVEN, VERSION I

1. "Then we can have a party.
A birthday party for Bunny."

A birthday party tonight for Bunny.
A birthday cake for Bunny.
A birthday party is for Bunny.

2. "I like the cakes we made," said Susan.

"I like the cakes that we made," said Susan.
"I want the cakes we made," said Susan.
"I like the cakes and candles we made," said Susan.

3. I want to help make the birthday cakes.

I want to help quickly make the birthday cakes.
I want to help make the white cakes.
I want to help to make the birthday cakes.

4. Red Hen and Black Hen came by.

Red Hen and White Hen came by.
Red Hen came by and Black Hen saw the cakes.
Red Hen came by and Black Hen came by.

5. Soon all of the corn on the little cakes was gone.

Soon all of the corn on the cobs was gone.
Soon all of the corn Susan put on the little cakes was gone.
Soon all of the corn that was on the little cakes was gone.

6. "I think hens like corn cakes," said Betty.

"I think that hens like corn cakes," said Betty.
"I think when hens like corn cakes," said Betty.
"I think hens like corn bread," said Betty.

FIRST READER, PASSAGE SEVEN, VERSION II

1. "I will run and bring some water," said Susan.

"I will play and bring some water," said Susan.
"I will run and I will bring some water," said Susan.
"I will run and Betty will bring some water," said Susan.

2. But this corn will look like little yellow candles.

But this corn will look like little yellow candles look.
But this corn will look like little yellow candles burning.
But this corn will look like little brown candles.

3. White Hen came by with her chicks.
"Cluck! Cluck!"

"Cluck! Cluck!" said Betty.
"Cluck! Cheep!"
"Cluck! Cluck!" said White Hen.

4. They ate and ate.

They ate and they ate.
They ate and Susan ate.
They ate and drank.

5. "Look at the little cakes!" said Susan.

"They look at the little cakes!" said Susan.
"Look at the little chicks!" said Susan.
"You look at the little cakes!" said Susan.

6. But we had a party for three hens and some little yellow chicks.

But we had a cake for three hens and some little yellow chicks.

But we had a party for three hens and we had a party for some little yellow chicks.

But we had a party for three hens and we saw some little yellow chicks.

FIRST READER, PASSAGE EIGHT, VERSION I

1. One day Mother Rabbit called, "Will you help me take this cabbage to Aunt Rabbit?"

One day Mother Rabbit called, "Will you help me take this cake to Aunt Rabbit?"

One day Mother Rabbit called, "Will you help me to take this cabbage to Aunt Rabbit?"

One day Mother Rabbit called, "Will you help me quickly take this cabbage to Aunt Rabbit?"

2. Then he took the cabbage and got on his bicycle.

Then he took the cabbage and the girl got on his bicycle.
Then he saw the cabbage and got on his bicycle.
Then he took the cabbage and he got on his bicycle.

3. "That is a big hill," said the frog.
"A big, big hill."

"It is a big, big hill."
"A big, big tree."
"You see a big, big hill."

4. Up went Billy and up went his bicycle.
Little by little.

Little by little Billy went.
Little and little.
Little by little said Billy.

5. Aunt Rabbit was happy to see Billy Rabbit and his new bicycle.

Aunt Rabbit was happy to see Billy Rabbit and Billy had his new bicycle.
Aunt Rabbit was happy to see Billy Rabbit and Aunt Rabbit was happy to see his new bicycle.
Aunt Rabbit was happy to see Billy Rabbit and his new train.

6. I have something you will like.

I have something you will want.
I have something maybe you will like.
I have something that you will like.

FIRST READER, PASSAGE EIGHT, VERSION II

1. "I think I can," said Billy Rabbit.

"I think I know," said Billy Rabbit.
"I think that I can," said Billy Rabbit.
"I think when I can," said Billy Rabbit.

2. A frog by the brook saw Billy Rabbit.

A frog that was by the brook saw Billy Rabbit.
A frog playing by the brook saw Billy Rabbit.
A frog by the lake saw Billy Rabbit.

3. Up went Billy and his bicycle.

Up went Billy and there was his bicycle.
Up walked Billy and his bicycle.
Up went Billy and up went his bicycle.

4. Billy worked as hard as he could.

Billy worked as hard as he could work.
Billy worked as long as he could.
Billy worked as hard as he could today.

5. "Stay to dinner, Billy," she said.

"Stay to eat, Billy," she said.
"They stay to dinner, Billy," she said.
"You stay to dinner, Billy," she said.

6. We will have cabbage and wheat cakes with honey.

We will have cabbage and Billy likes wheat cakes with honey.
We will have cabbage and we will have wheat cakes with honey.
We will have cabbage and cup cakes with honey.

SECOND READER, PASSAGE ONE, VERSION I

1. One morning Ben and Mary Ann ran to Father.

One morning Ben and Mary Ann talked to Father.
One morning Ben ran to Father and Mary Ann went to school.
One morning Ben ran to Father and Mary Ann ran to Father.

2. "I think there are some empty boxes in the basement," said Father.

"I think that there are some empty boxes in the basement," said Father.
"I think there are some empty baskets in the basement," said Father.
"I think when there are some empty boxes in the basement," said Father.

3. The children put some boxes on Ben's express wagon, and went up the street to school.

The children put some boxes on Ben's red wagon, and went up the street to school.
The children put some boxes on Ben's express wagon, and he went up the street to school.
The children put some boxes on Ben's express wagon, and they went up the street to school.

4. "We want all the boxes we can get," said Ben.

"We want all the boxes today we can get," said Ben.
"We want all the boxes that we can get," said Ben.
"We want all the boxes we can see," said Ben.

5. Then the children went around the block and on to school.

Then the children went around the block and he ran on to school.
Then the children went up the block and on to school.
Then the children went around the block and they went on to school.

6. Ben said, "We can play store with these boxes and peanuts."

Ben said, "We can play house with these boxes and peanuts."
Ben said, "We can play store with these boxes and we can play store with these peanuts."
Ben said, "We can play store with these boxes and we can eat these peanuts."

SECOND READER, PASSAGE ONE, VERSION II

1. Can you help us find some boxes, please?

Can you help us quickly find some boxes, please?
Can you help us to find some boxes, please?
Can you help us get some boxes, please?

2. "I think that there are some empty boxes in the basement," said Father.
"Take as many as you want."

"Take as many as they want."
"They take as many as you want."
"You take as many as you want."

3. The man in the shoe store called to them, "Do you want some more boxes?"

The man talking in the shoe store called to them, "Do you want some more boxes?"
The man in the shoe store called to him, "Do you want some more boxes?"
The man who was in the shoe store called to them, "Do you want some more boxes?"

4. He had a sign which said, "Popcorn and peanuts, warm and brown."

He had a sign which said, "Popcorn and peanuts are warm and brown."
He had a sign which said, "Popcorn and peanuts can get warm and brown."
He made a sign which said, "Popcorn and peanuts, warm and brown."

5. At school Mary Ann picked up the little yellow box.
Rattle, rattle, rattle!

Rattle, rattle, rattle it went!
Rattle, rattle, bump!
Rattle, rattle, rattle she said!

6. Mr. Tony's peanuts are better than any other peanuts in town.

Mr. Tony's peanuts are better than any other peanuts in town to smell.
Mr. Tony's peanuts are better than any other peanuts in town are.
Mr. Brown's peanuts are better than any other peanuts in town.

SECOND READER, PASSAGE TWO, VERSION I

1. Mary Ann put on her new blue dress and her new blue shoes.

   Mary Ann put on her new blue dress and she found her new blue shoes.
   Mary Ann put on her new blue dress and her pretty blue shoes.
   Mary Ann put on her new blue dress and she put on her new blue shoes.

2. "Run to the window," called Mother. "Your friends will soon be here."

   "They run to the window," called Mother.
   "You run to the window," called Mother.
   "Run to the door," called Mother.

3. Mary Ann opened the door of the apartment and looked out.

   Mary Ann went to the door of the apartment and looked out.
   Mary Ann opened the door of the apartment and she looked out.
   Mary Ann opened the door of the apartment and he looked out.

4. Then they all helped Mary Ann eat the birthday cake!

   Then they all helped Mary Ann get the birthday cake!
   Then they all helped Mary Ann quickly eat the birthday cake!
   Then they all helped Mary Ann to eat the birthday cake!

5. "I thought something was happening up here today," he said.

   "I thought that something was happening up here today," he said.
   "I thought something was happening down here today," he said.
   "I thought before something was happening up here today," he said.

6. "Now I have a surprise for you," said Bill. "We have some new neighbours."
   "Mrs. Tabby cat with five kittens!" said Mary Ann.

   "Mrs. Tabby cat with four kittens!" said Mary Ann.
   "There is Mrs. Tabby cat with five kittens!" said Mary Ann.
   "We want Mrs. Tabby cat with five kittens!" said Mary Ann.

SECOND READER, PASSAGE TWO, VERSION II

1. Ben and Joe got dressed for the party, too.

   Ben and Joe got something for the party, too.
   Ben got dressed for the party and Joe got dressed for the party, too.
   Ben got dressed for the party and Joe went to the party, too.

2. "That looks like the bus now," said Joe.

"That looks like the bus from school now," said Joe.
"That looks like the bus looks now," said Joe.
"That looks like the truck now," said Joe.

3. The children watched Sonny Bear dance and jump.

The children watched Sonny Bear dance and he watched them jump.
The children watched Sonny Bear dance and play.
The children watched Sonny Bear dance and they watched him jump.

4. After the party Mary Ann took some birthday cake out to Bill, the elevator man.

After the party Mary Ann took some birthday cake out to Bill who was the elevator man.

After the party Mary Ann took some birthday cake in to Bill, the elevator man.

After the party Mary Ann took some birthday cake out to Bill and the elevator man.

5. The elevator began to go down.
Down to the basement.

Down to the basement quickly.
Down to the basement it went.
Quickly to the basement.

6. I like the fine sign Bill has put on the box!

I like the fine sign today Bill has put on the box!
I like the big sign Bill has put on the box!
I like the fine sign that Bill has put on the box!

SECOND READER, PASSAGE THREE, VERSION I

1. They were looking in their big boxes for trick hats and funny shoes.

They were looking in their big boxes for trick hats and they found funny shoes.

They were looking in their big boxes for big hats and funny shoes.

They were looking in their big boxes for trick hats and they were looking in their big boxes for funny shoes.

2. The tall clown had a policeman suit and green hair.

The tall clown had a policeman suit and he wanted green hair.
The tall clown had a policeman suit and he had green hair.
The tall clown had a policeman suit and green shoes.

3. I think the children will like it.

I think that the children will like it.
I think maybe the children will like it.
I think the children will want it.

4. The big clown went out with Billy, his trick goat.

The big clown went out with Billy, his little goat.
The big clown went out with Billy who was his trick goat.
The big clown went out with Billy and his trick goat.

5. Mary and Ben were in the big circus tent.

Mary and Ben were in the brown circus tent.
Mary was in the big circus tent and Ben was in the big circus tent.
Mary was in the big circus tent and Ben found her.

6. "I see the clown who helped me find my ticket," said Ben.

"I see the clown who helped me to find my ticket," said Ben.
"I see the clown who helped me quickly find my ticket," said Ben.
"I see the man who helped me find my ticket," said Ben.

SECOND READER, PASSAGE THREE, VERSION II

1. The three clowns wanted to look as funny as they could for the big circus.

The three clowns wanted to look as bad as they could for the big circus.
The three clowns wanted to look as funny as they could look for the big circus.
The three clowns wanted to look as funny as they could dress for the big circus.

2. "This is the funniest hat I have," said the big clown.

"This is the funniest hat here I have," said the big clown.
"This is the funniest hat that I have," said the big clown.
"This is the funniest suit I have," said the big clown.

3. The hat had a little bell on the top.
Tinkle! Tinkle!

Tinkle! Tinkle! said the clown.
Tinkle! Tink!
Tinkle! Tinkle! it went.

4. He painted his face white and put a big red dot on his nose.

He painted his face white and he put a big red dot on his nose.
He painted his face white and they put a big red dot on his nose.
He painted his face white and put a big blue dot on his nose.

5. "The clowns!" called Mary. "The clowns are coming this way."

"The circus!" called Mary.
"There are the clowns!" called Mary.
"You like the clowns!" called Mary.

6. "He sees you too, Ben," said Father.
"Look at him wave."

"They look at him wave."
"Look at me wave."
"You look at him wave."

SECOND READER, PASSAGE FOUR, VERSION I

1. "Mother!" Ben called.
"Guess where I'm going."

"You guess where I'm going."
"They guess where I'm going."
"Guess when I'm going."

2. "I'm glad you can go," said Mother.

"I'm glad today you can go," said Mother.
"I'm glad he can go," said Mother.
"I'm glad that you can go," said Mother.

3. "I will help you get ready," said Mother.

"I will help you to get ready," said Mother.
"I will help you get dressed," said Mother.
"I will help you quickly get ready," said Mother.

4. Away Ben and Father went to the ball park.

Away Ben and Mother went to the ball park.
Away Ben went to the ball park and away Father went to the ball park.
Away Ben went to the ball park and away Father went to work.

5. All the people were talking and laughing.

All the people were talking and he was laughing.
All the men were talking and laughing.
All the people were talking and they were laughing.

6. Everybody watched the ball go high into the air.
Up, up, up.

Up, up, up it went.
Up, up, up they went.
Up, up and over.

SECOND READER, PASSAGE FOUR, VERSION II

1. Father is going to take me to the ball game.
The game at the ball park.

The game at the new park.
The game today at the ball park.
The game is at the ball park.

2. Then one morning Ben said, "This is the day I'm going to the big game.

Then one morning Ben said, "This is the day that I'm going to the big game."
Then one morning Ben said, "This is the day I'm going to the big race."
Then one morning Ben said, "This is the day and I'm going to the big game."

3. She brought Ben his hat and his baseball glove.

She brought Ben his hat and he watched his baseball glove.
She brought Ben his hat and his baseball bat.
She brought Ben his hat and she brought him his baseball glove.

4. They soon found their places and sat down.

They soon found their places and you sat down.
They soon found their places and went down.
They soon found their places and they sat down.

5. Ben's father was talking as loud as anyone.

Ben's father was laughing as loud as anyone.
Ben's father was talking as loud as anyone was talking.
Ben's father was talking as loud as anyone in the house.

6. The people around Ben called, "Good catch, boy!"

The people and Ben called, "Good catch, boy!"
The people talking around Ben called, "Good catch, boy!"
The people who were around Ben called, "Good catch, boy!"

SECOND READER, PASSAGE FIVE, VERSION I

1. "Some of the children at school have gardens," thought Abel.

"Three of the children at school have gardens," thought Abel.
"Some of the children playing at school have gardens," thought Abel.
"Some of the children who are at school have gardens," thought Abel.

2. Then he took the shovel and began to dig.

Then he took the shovel and he began to dig.
Then he took the shovel and she began to dig.
Then he took the pail and began to dig.

3. "Can you help me plant my corn?" he asked.

"Can you help me run plant my corn?" he asked.
"Can you help me find my corn?" he asked.
"Can you help me to plant my corn?" he asked.

4. I suppose you have heard the old rhyme?

I suppose you have heard the old song?
I suppose when you have heard the old rhyme?
I suppose that you have heard the old rhyme?

5. The squirrels and the chicks did not get this corn.

The squirrels did not get this corn and the chicks did not get this corn.
The squirrels and the chicks did not see this corn.
The squirrels did not get this corn and the chicks wanted to get this corn.

6. Mr. Gates said, "This is about the best corn I ever saw."

Mr. Gates said, "This is about the biggest corn I ever saw."
Mr. Gates said, "This is about the best corn cob I ever saw."
Mr. Gates said, "This is about the best corn that I ever saw."

SECOND READER, PASSAGE FIVE, VERSION II

1. He picked up cans and sticks.

They picked up cans and sticks.
He picked up cans and he threw sticks.
He picked up cans and he picked up sticks.

2. Abel knew how to plant beans, but not corn.

Abel knew how to plant beans, but he did not know how to plant corn.
Abel knew when to plant beans, but not corn.
Abel knew how to plant beans, but he did not have corn.

3. Mr. Gates told him just what to do.
"Put four seeds in each hill," he said.

"We put four seeds in each hill," he said.
"Put some seeds in each hill," he said.
"You put four seeds in each hill," he said.

4. One is for the squirrel,
One is for the crow,
One is for the chicks,
And one to grow.

And one trying to grow.
And one is to grow.
But one to grow.

5. How it did grow!
Right up under Mr. Gates' window.

Abel went right up under Mr. Gates' window.
It grew right up under Mr. Gates' window.
Right up under Mr. Gates' roof.

6. It is as pretty as a picture.

It is as nice as a picture.
It is as pretty as a picture show.
It is as pretty as a picture is.

SECOND READER, PASSAGE SIX, VERSION I

1. Up flew the big airplane.
"Just the same old trip," said the pilot.

"Just the same old plane," said the pilot.
"We want just the same old trip," said the pilot.
"This is just the same old trip," said the pilot.

2. "There are the piles of lumber at the lumber mill and by the loading station," said the co-pilot.

"There are the piles of lumber at the lumber mill and there are the piles of lumber by the loading station," said the co-pilot.

"There are the piles of lumber at the lumber mill and there is a train by the loading station," said the co-pilot.

"There are the piles of lumber at the lumber yard and by the loading station," said the co-pilot.

3. All at once the co-pilot said, "Look down there!"

All at once the co-pilot said, "Go down there!"
All at once the co-pilot said, "We look down there!"
All at once the co-pilot said, "You look down there!"

4. The airplane turned and flew over the farmhouse.

The airplane turned and the bird flew over the farmhouse.
The airplane turned and flew over the barn.
The airplane turned and it flew over the farmhouse.

5. I don't think the farmer knows that his barn is burning.

I don't think and the farmer knows that his barn is burning.
I don't think that the farmer knows that his barn is burning.
I don't think the man knows that his barn is burning.

6. The farmer and his wife heard the noise.

The farmer heard the noise and his wife heard the noise.
The farmer heard the noise and his wife came out.
The farmer and his wife heard the fire engine.

SECOND READER, PASSAGE SIX, VERSION II

1. There is the same train we always see on the track here.

There is the same train engine we always see on the track here.
There is the same train that we always see on the track here.
There is the same engine we always see on the track here.

2. The pilot knew all of the big farms along the way.

The pilot knew all of the big farms along the road.
The pilot knew all of the big farms of wheat along the way.
The pilot knew all of the big farms which were along the way.

3. What is that by the farmhouse?
It looks like smoke.

It smells like smoke.
It looks like smoke looks.
It looks like smoke going up.

4. The airplane turned and flew over the farmhouse.
Roar! Roar!

Roar! Roar! it went.
Roar! Buzz!
Roar! Roar! said the pilot.

5. It flew low and straight ahead.

It flew low and it flew straight ahead.
It flew down and straight ahead.
It flew low and they looked straight ahead.

6. He watched the fire engines help put out the fire.

He watched the fire engines help quickly put out the fire.
He watched the fire engines help to put out the fire.
She watched the fire engines help put out the fire.

SECOND READER, PASSAGE SEVEN, VERSION I

1. The animals thought the little pond was beautiful.

The animals thought how the little pond was beautiful.
The animals thought the blue pond was beautiful.
The animals thought that the little pond was beautiful.

2. A black bear came to the pond to drink and to catch fish.

A black bear came to the pond to drink and he came to the pond to catch fish.
A black bear came to the pond to drink and he went to the lake to catch fish.
A black bear came to the pond to drink and to see fish.

3. The grass the rabbit liked to eat turned brown.

The grass over there the rabbit liked to eat turned brown.
The grass which the rabbit liked to eat turned brown.
The grass the rabbit liked to eat turned brown.

4. I will help you find it.

I will help you to find it.
I will help you get it.
I will help you, then find it.

5. All the animals followed.
On through the hot dry woods.

On through the hot dry grass.
On through the hot dry woods with the duck.
On through the hot dry woods they went.

6. The duck went ahead and showed the others the way.

The duck went ahead and showed the others the lake.
The duck went ahead and she showed the others the way.
The duck went ahead and they showed the others the way.

SECOND READER, PASSAGE SEVEN, VERSION II

1. A mother duck quacked to her baby ducks near the shore.

A big duck quacked to her baby ducks near the shore.
A mother duck quacked to her baby ducks who were near the shore.
A mother duck quacked to her baby ducks playing near the shore.

2. The birds and the raccoons liked the little pond, too.

   The birds liked the little pond and the raccoons saw the birds, too.
   The birds and the raccoons saw the little pond, too.
   The birds liked the little pond and the raccoons liked the little pond, too.

3. The duck said, "Far away through the trees, there is a big lake which has more water than our little pond."

   The duck said, "Far away through the trees, there is a big lake which has more water than our little pond has."
   The duck said, "Far away through the trees, there is a big lake which has more fish than our little pond."
   The duck said, "Far away through the trees, there is a big lake which has more water than our little pond wants."

4. I will help you to find it.
   Follow me.

   They follow me.
   You follow me.
   Follow them.

5. I saw green grass and flowers there.

   I saw green grass and trees there.
   I saw green grass and smelled flowers there.
   I saw green grass and I saw flowers there.

6. The animals did not think the trip a long one this time.

   The animals did not think the trip there a long one this time.
   The animals did not think the trip was a long one this time.
   The animals did not think the day a long one this time.

SECOND READER, PASSAGE EIGHT, VERSION I

1. Every morning all the animals in the woods went to school.

   Every morning all the animals playing in the woods went to school.
   Every morning all the animals in the woods went to work.
   Every morning all the animals who were in the woods went to school.

2. Soon Billy Bunny and Betty Bunny came down the road.
   Hoppity-hop! Hoppity-hop!

   Hoppity-hop! Hoppity-hop! said Billy.
   Hoppity-hop! Hoppity-hop! they went.
   Hoppity-hop! Thumpity-thump!

3. The five squirrel brothers brought an apple pie and a basket of nuts.

The five squirrel brothers brought an apple pie and their mother brought a basket of nuts.

The five squirrel brothers brought an apple pie and they brought a basket of nuts.

The five squirrel brothers brought an apple pie and a box of nuts.

4. Timothy followed them and he peeked around a tree.
A picnic!

It was a picnic!
A party!
I like a picnic!

5. Mac Mouse saw Timothy.
"Come to the picnic," he called.

"They come to the picnic," he called.
"Hurry to the picnic," he called.
"You come to the picnic," he called.

6. "Now you can see it is always good to know how to read," she said.

"Now you can see that it is always good to know how to read," she said.

"Now you can see it is always good to know when to read," she said.

"Now you can see why it is always good to know how to read," she said.

SECOND READER, PASSAGE EIGHT, VERSION II

1. Soon Billy Bunny and Betty Bunny came down the road.

Soon Billy Bunny came down the road and Betty Bunny followed with a basket.

Soon Billy Bunny came down the road and Betty Bunny came down the road.

Soon Billy Bunny and Betty Bear came down the road.

2. Billy was helping Betty carry a big bowl of cabbage salad.

Billy was helping Betty slowly carry a big bowl of cabbage salad.
Billy was helping Betty carry a big basket of cabbage salad.
Billy was helping Betty to carry a big bowl of cabbage salad.

3. Timothy followed them and peeked around a tree.

Timothy followed them and he peeked around a tree.
Timothy followed them and peeked over a tree.
Timothy followed them and they peeked around a tree.

4. It was the most wonderful picnic he had ever seen.

It was the most wonderful party he had ever seen.
It was the most wonderful picnic that he had ever seen.
It was the most wonderful picnic lunch he had ever seen.

5. Just then Mother Bear came down the road with a ginger cake and Timothy's letter.

Just then Mother Bear came down the road with a ginger cake and they had Timothy's letter.

Just then Mother Bear came down the road with a ginger cookie and Timothy's letter.

Just then Mother Bear came down the road with a ginger cake and she came down the road with Timothy's letter.

6. Before long he could read as well as anyone in the woods.

Before long he could read as well as anyone in the school.

Before long he could read as well as anyone in the woods could read.

Before long he could read as well as anyone in the woods going to school.

APPENDIX E

t-TEST RESULTS

TABLE XXVII

t-TEST RESULTS ON ORAL READING FOR THE "WH DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.08	0.06	0.15	0.12	158	1.079
Proportion (including)	0.08	0.06	0.15	0.11	158	1.096
Errors G_1	0.26	0.22	0.41	0.39	158	0.692
Errors G_2	0.19	0.11	0.34	0.30	158	1.498
Errors S_1						
Errors S_2	0.09	0.04	0.26	0.20	158	0.127
Errors S_3	0.14	0.08	0.30	0.26	158	1.288
Errors +G+S	0.09	0.04	0.26	0.20	158	1.144
Errors -G-S	0.09	0.11	0.23	0.28	158	-0.311
Preceding	0.08	0.06	0.14	0.14	158	0.236
Following	0.10	0.05	0.27	0.16	158	1.485
Matrix	0.07	0.06	0.12	0.14	158	0.299
Embed./conj.	0.09	0.05	0.26	0.16	158	1.256

TABLE XXVIII

t-TEST RESULTS ON ORAL READING FOR THE "WH DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.04	0.08	0.06	158	0.022
Proportion (including)	0.04	0.05	0.08	0.06	158	-0.506
Errors G_1	0.23	0.31	0.41	0.45	158	-1.172
Errors G_2	0.20	0.29	0.39	0.43	158	-1.367
Errors S_1	0.02	0.02	0.16	0.14	158	0.0
Errors S_2	0.11	0.19	0.29	0.37	158	-1.561
Errors S_3	0.14	0.21	0.33	0.39	158	-1.277
Errors +G+S	0.11	0.19	0.29	0.37	158	-1.561
Errors -G-S	0.11	0.20	0.30	0.38	158	-1.600
Preceding	0.05	0.04	0.13	0.08	158	0.506
Following	0.04	0.04	0.10	0.09	158	-0.203
Matrix	0.04	0.04	0.10	0.09	158	0.140
Embed./conj.	0.05	0.06	0.12	0.11	158	-1.025

TABLE XXIX

t-TEST RESULTS ON ORAL READING FOR THE "BE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.06	0.07	0.11	0.13	158	-1.119
Proportion (including)	0.07	0.07	0.11	0.12	158	-0.466
Errors G_1	0.17	0.16	0.37	0.34	158	0.209
Errors G_2	0.17	0.13	0.36	0.32	158	0.749
Errors S_1						
Errors S_2	0.07	0.07	0.23	0.23	158	0.085
Errors S_3	0.10	0.09	0.29	0.27	158	0.165
Errors +G+S	0.07	0.07	0.23	0.23	158	0.085
Errors -G-S	0.09	0.13	0.28	0.30	158	-0.805
Preceding	0.03	0.05	0.14	0.15	158	-0.719
Following	0.07	0.06	0.14	0.14	158	0.364
Matrix	0.01	0.02	0.05	0.14	158	-1.015
Embed./conj.	0.03	0.04	0.15	0.12	158	-0.538

TABLE XXX

t-TEST RESULTS ON ORAL READING FOR THE "BE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.09	0.07	0.20	0.16	158	0.598
Proportion (including)	0.08	0.08	0.17	0.14	158	0.060
Errors G_1	0.11	0.06	0.29	0.20	158	1.152
Errors G_2	0.16	0.16	0.36	0.34	158	0.0
Errors S_1						
Errors S_2	0.06	0.11	0.22	0.29	158	-1.259
Errors S_3	0.08	0.12	0.27	0.31	158	-0.862
Errors +G+S	0.06	0.11	0.22	0.29	158	-1.259
Errors -G-S	0.12	0.11	0.30	0.28	158	0.046
Preceding	0.02	0.02	0.07	0.08	158	0.071
Following	0.08	0.07	0.19	0.16	158	0.456
Matrix	0.03	0.03	0.09	0.11	158	-0.155
Embed./conj.	0.04	0.04	0.10	0.10	158	-0.024

TABLE XXXI

t-TEST RESULTS ON ORAL READING FOR THE "WH + BE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.08	0.08	0.12	0.12	158	-0.241
Proportion (including)	0.08	0.08	0.12	0.12	158	0.061
Errors G_1	0.21	0.21	0.39	0.37	158	0.066
Errors G_2	0.19	0.23	0.37	0.37	158	-0.765
Errors S_1						
Errors S_2	0.08	0.10	0.27	0.28	158	-0.409
Errors S_3	0.15	0.17	0.34	0.32	158	-0.371
Errors +G+S	0.08	0.10	0.27	0.28	158	-0.409
Errors -G-S	0.12	0.18	0.30	0.33	158	-1.136
Preceding	0.09	0.07	0.22	0.17	158	0.519
Following	0.08	0.07	0.14	0.14	158	0.191
Matrix	0.08	0.11	0.15	0.15	158	-1.089
Embed./conj.	0.09	0.05	0.18	0.12	158	1.585

TABLE XXXII

t-TEST RESULTS ON ORAL READING FOR THE "WH + BE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.04	0.07	0.07	158	-0.163
Proportion (including)	0.04	0.04	0.07	0.06	158	0.0
Errors G_1	0.12	0.16	0.32	0.35	158	-0.690
Errors G_2	0.17	0.20	0.37	0.38	158	-0.460
Errors S_1						
Errors S_2	0.15	0.16	0.34	0.35	158	-0.210
Errors S_3	0.16	0.19	0.35	0.38	158	-0.523
Errors +G+S	0.15	0.16	0.34	0.35	158	-0.210
Errors -G-S	0.12	0.13	0.31	0.31	158	-0.020
Preceding	0.03	0.03	0.10	0.08	158	0.166
Following	0.07	0.04	0.17	0.12	158	1.261
Matrix	0.03	0.03	0.07	0.07	158	-0.129
Embed./conj.	0.06	0.04	0.15	0.10	158	0.991

TABLE XXXIII

t-TEST RESULTS ON ORAL READING FOR "(THAT) + S AS OBJECT" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.06	0.05	0.11	0.10	158	0.779
Proportion (including)	0.06	0.06	0.11	0.10	158	0.203
Errors G_1	0.22	0.19	0.38	0.38	158	0.592
Errors G_2	0.15	0.11	0.33	0.28	158	0.771
Errors S_1						
Errors S_2	0.11	0.06	0.31	0.23	158	1.147
Errors S_3	0.14	0.08	0.33	0.24	158	1.362
Errors +G+S	0.11	0.06	0.31	0.23	158	1.147
Errors -G-S	0.17	0.22	0.34	0.40	158	-0.815
Preceding	0.04	0.08	0.15	0.23	158	-1.323
Following	0.08	0.06	0.14	0.11	158	1.041
Matrix	0.04	0.07	0.11	0.20	158	-1.262
Embed./conj.	0.07	0.07	0.16	0.15	158	0.066

TABLE XXXIV

t-TEST RESULTS ON ORAL READING FOR "(THAT) + S AS OBJECT" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.03	0.07	0.06	158	1.232
Proportion (including)	0.04	0.03	0.07	0.05	158	1.419
Errors G_1	0.17	0.15	0.36	0.35	158	0.350
Errors G_2	0.23	0.21	0.40	0.40	158	0.278
Errors S_1	0.02	0.01	0.12	0.11	158	0.228
Errors S_2	0.14	0.09	0.34	0.29	158	1.005
Errors S_3	0.20	0.16	0.39	0.36	158	0.724
Errors +G+S	0.14	0.09	0.34	0.29	158	1.005
Errors -G-S	0.10	0.11	0.29	0.30	158	-0.180
Preceding	0.03	0.02	0.12	0.10	158	0.493
Following	0.05	0.04	0.08	0.07	158	1.098
Matrix	0.03	0.02	0.10	0.09	158	0.461
Embed./conj.	0.05	0.04	0.09	0.07	158	1.379

TABLE XXXV

t-TEST RESULTS ON ORAL READING FOR "PERFORMATIVE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.10	0.10	0.23	0.23	158	-0.003
Proportion (including)	0.10	0.08	0.23	0.16	158	0.574
Errors G_1	0.05	0.13	0.22	0.33	158	-1.851
Errors G_2	0.10	0.16	0.30	0.35	158	-1.121
Errors S_1						
Errors S_2	0.07	0.09	0.27	0.27	158	-0.294
Errors S_3	0.10	0.12	0.30	0.32	158	-0.506
Errors +G+S	0.07	0.09	0.27	0.27	158	-0.294
Errors -G-S	0.12	0.11	0.33	0.29	158	0.377
Preceding	0.10	0.10	0.23	0.23	158	-0.003
Following						

TABLE XXXVI

t-TEST RESULTS ON ORAL READING FOR "PERFORMATIVE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.11	0.07	0.30	0.21	158	1.051
Proportion (including)	0.23	0.05	0.41	0.12	158	3.815
Errors G_1	0.14	0.11	0.35	0.30	158	0.605
Errors G_2	0.14	0.16	0.35	0.36	158	-0.335
Errors S_1	0.10	0.05	0.30	0.22	158	1.198
Errors S_2	0.14	0.12	0.35	0.32	158	0.397
Errors S_3	0.14	0.13	0.35	0.34	158	0.116
Errors +G+S	0.14	0.12	0.35	0.32	158	0.397
Errors -G-S	0.06	0.06	0.24	0.24	158	0.0
Preceding	0.10	0.07	0.29	0.21	158	0.951
Following	0.01	0.00	0.04	0.02	158	0.812

TABLE XXXVII

t-TEST RESULTS ON ORAL READING FOR "IMPERATIVE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.07	0.10	0.13	0.22	158	-1.159
Proportion (including)	0.07	0.08	0.13	0.14	158	-0.379
Errors G_1	0.15	0.18	0.35	0.37	158	-0.529
Errors G_2	0.12	0.16	0.31	0.34	158	-0.702
Errors S_1						
Errors S_2	0.06	0.06	0.22	0.23	158	-0.203
Errors S_3	0.06	0.05	0.22	0.20	158	0.249
Errors +G+S	0.12	0.16	0.32	0.35	158	-0.661
Errors -G-S	0.06	0.03	0.24	0.17	158	0.949
Preceding						
Following	0.07	0.10	0.13	0.22	158	-1.084
Matrix	0.03	0.03	0.12	0.15	158	0.0
Embed./conj.	0.05	0.05	0.14	0.12	158	-0.147

TABLE XXXVIII

t-TEST RESULTS ON ORAL READING FOR "IMPERATIVE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.03	0.10	0.07	158	0.457
Proportion (including)	0.04	0.03	0.10	0.08	158	0.061
Errors G_1	0.08	0.16	0.27	0.36	158	-1.490
Errors G_2	0.06	0.16	0.23	0.36	158	-2.045
Errors S_1						
Errors S_2	0.01	0.04	0.11	0.19	158	-1.010
Errors S_3	0.05	0.16	0.22	0.36	158	-2.157
Errors +G+S	0.01	0.04	0.11	0.19	158	-1.010
Errors -G-S	0.09	0.28	0.28	0.22	158	0.941
Preceding	0.00	0.01	0.02	0.03	158	-1.010
Following	0.03	0.02	0.10	0.06	158	0.899
Matrix						
Embed./conj.	0.01	0.02	0.05	0.06	158	-0.795

TABLE XXXIX

t-TEST RESULTS ON ORAL READING FOR "PREPOSITION DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.07	0.06	0.12	0.11	158	0.719
Proportion (including)	0.07	0.07	0.12	0.12	158	0.398
Errors G_1	0.17	0.25	0.36	0.41	158	-1.168
Errors G_2	0.22	0.26	0.40	0.41	158	-0.542
Errors S_1						
Errors S_2	0.16	0.16	0.35	0.34	158	-0.023
Errors S_3	0.22	0.26	0.40	0.41	158	-0.673
Errors +G+S	0.10	0.16	0.29	0.34	158	-1.146
Errors -G-S	0.14	0.15	0.33	0.33	158	-0.279
Preceding	0.06	0.04	0.14	0.10	158	0.953
Following	0.09	0.08	0.19	0.21	158	0.304

TABLE XL

t-TEST RESULTS ON ORAL READING FOR "PREPOSITION DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.05	0.04	0.12	0.06	158	0.813
Proportion (including)	0.05	0.05	0.12	0.06	158	0.189
Errors G_1	0.12	0.17	0.31	0.37	158	-0.845
Errors G_2	0.15	0.28	0.33	0.44	158	-2.053
Errors S_1	0.01	0.01	0.11	0.11	158	0.0
Errors S_2	0.11	0.21	0.30	0.40	158	-1.753
Errors S_3	0.12	0.25	0.30	0.43	158	-2.172
Errors +G+S	0.11	0.21	0.30	0.40	158	-1.783
Errors -G-S	0.10	0.09	0.27	0.27	158	0.367
Preceding	0.04	0.05	0.14	0.11	158	-0.210
Following	0.05	0.03	0.13	0.08	158	1.400

TABLE XLI

t-TEST RESULTS ON ORAL READING FOR "VERB PHRASE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.05	0.11	0.07	158	-0.372
Proportion (including)	0.04	0.04	0.11	0.07	158	-0.353
Errors G_1	0.14	0.16	0.34	0.35	158	-0.303
Errors G_2	0.16	0.19	0.35	0.39	158	-0.597
Errors S_1						
Errors S_2	0.08	0.06	0.26	0.24	158	0.523
Errors S_3	0.12	0.14	0.31	0.35	158	-0.436
Errors +G+S	0.08	0.06	0.26	0.24	158	0.523
Errors -G-S	0.11	0.17	0.31	0.37	158	-0.096
Preceding	0.04	0.04	0.11	0.07	158	-0.317
Following	0.02	0.02	0.13	0.12	158	0.157
Matrix	0.04	0.04	0.10	0.09	158	-0.335
Embed./conj.	0.04	0.05	0.14	0.09	158	-0.285

TABLE XLII.

t-TEST RESULTS ON ORAL READING FOR "VERB PHRASE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.03	0.07	0.07	158	0.858
Proportion (including)	0.04	0.03	0.07	0.06	158	1.094
Errors G_1	0.13	0.14	0.32	0.33	158	-0.162
Errors G_2	0.23	0.17	0.41	0.36	158	1.102
Errors S_1						
Errors S_2	0.12	0.10	0.31	0.29	158	0.393
Errors S_3	0.20	0.14	0.40	0.34	158	1.093
Errors +G+S	0.11	0.10	0.30	0.29	158	0.135
Errors -G-S	0.07	0.14	0.23	0.34	158	-1.684
Preceding	0.04	0.04	0.08	0.07	158	0.650
Following						
Matrix	0.04	0.03	0.10	0.08	158	0.997
Embed./conj.	0.06	0.04	0.14	0.07	158	0.921

TABLE XLIII

t-TEST RESULTS ON ORAL READING FOR "NOUN PHRASE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.05	0.07	0.11	0.11	158	-1.218
Proportion (including)	0.05	0.07	0.11	0.11	158	-1.366
Errors G_1	0.15	0.27	0.34	0.42	158	-1.974
Errors G_2	0.06	0.20	0.22	0.38	158	-2.827
Errors S_1						
Errors S_2	0.02	0.09	0.08	0.28	158	-2.170
Errors S_3	0.04	0.16	0.15	0.36	158	-2.836
Errors +G+S	0.01	0.09	0.08	0.28	158	-2.274
Errors -G-S	0.11	0.23	0.29	0.39	158	-2.253
Preceding	0.06	0.08	0.13	0.14	158	-1.030
Following	0.04	0.04	0.14	0.10	158	0.282
Matrix	0.05	0.07	0.13	0.17	158	-0.709
Embed./conj.	0.05	0.08	0.14	0.18	158	-1.297

TABLE XLIV

t-TEST RESULTS ON ORAL READING FOR "NOUN PHRASE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.05	0.04	0.09	0.08	158	0.237
Proportion (including)	0.05	0.05	0.09	0.08	158	0.095
Errors G_1	0.16	0.25	0.37	0.43	158	-1.424
Errors G_2	0.16	0.28	0.35	0.43	158	-1.907
Errors S_1	0.01	0.02	0.11	0.11	158	-0.174
Errors S_2	0.09	0.19	0.28	0.37	158	-1.935
Errors S_3	0.13	0.22	0.32	0.39	158	-1.669
Errors +G+S	0.09	0.19	0.28	0.37	158	-1.935
Errors -G-S	0.14	0.11	0.34	0.28	158	0.633
Preceding	0.05	0.04	0.11	0.09	158	0.692
Following	0.04	0.04	0.12	0.11	158	-0.183
Matrix	0.04	0.04	0.11	0.10	158	0.149
Embed./conj.	0.05	0.05	0.12	0.10	158	0.117

TABLE XLV

t-TEST RESULTS ON ORAL READING FOR "NOUN PHRASE + AUXILIARY (VERB) DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.09	0.07	0.15	0.14	158	0.827
Proportion (including)	0.09	0.07	0.15	0.13	158	1.135
Errors G_1	0.19	0.15	0.36	0.33	158	0.861
Errors G_2	0.12	0.14	0.28	0.33	158	-0.382
Errors S_1						
Errors S_2	0.05	0.05	0.16	0.20	158	0.145
Errors S_3	0.11	0.11	0.28	0.29	158	0.039
Errors +G+S	0.05	0.03	0.16	0.16	158	0.411
Errors -G-S	0.24	0.18	0.40	0.37	158	0.938
Preceding	0.07	0.07	0.15	0.16	158	0.268
Following	0.12	0.05	0.26	0.15	158	2.010
Matrix	0.08	0.08	0.18	0.19	158	0.189
Embed./conj.	0.10	0.06	0.19	0.13	158	1.734

TABLE XLVI

t-TEST RESULTS ON ORAL READING FOR "NOUN PHRASE + AUXILIARY (VERB) DELETION AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.04	0.06	0.07	0.10	158	-1.775
Proportion (including)	0.04	0.06	0.07	0.10	158	-1.592
Errors G_1	0.17	0.13	0.36	0.32	158	0.851
Errors G_2	0.20	0.19	0.39	0.36	158	0.197
Errors S_1						
Errors S_2	0.07	0.10	0.24	0.27	158	-0.603
Errors S_3	0.15	0.12	0.34	0.29	158	0.578
Errors +G+S	0.07	0.10	0.24	0.27	158	-0.603
Errors -G-S	0.12	0.20	0.31	0.38	158	-1.532
Preceding	0.04	0.06	0.08	0.11	158	-1.696
Following	0.05	0.08	0.18	0.21	158	-0.772
Matrix	0.04	0.06	0.08	0.12	158	-1.467
Embed./conj.	0.05	0.06	0.15	0.15	158	-0.567

TABLE XLVII

t-TEST RESULTS ON ORAL READING FOR "NOUN PHRASE + VERB + OTHER ELEMENTS DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.10	0.09	0.13	0.12	158	0.591
Proportion (including)	0.10	0.08	0.13	0.12	158	0.517
Errors G_1	0.26	0.34	0.40	0.45	158	-1.306
Errors G_2	0.22	0.32	0.35	0.43	158	-1.594
Errors S_1	0.04	0.01	0.17	0.06	158	1.531
Errors S_2	0.13	0.19	0.30	0.35	158	-1.035
Errors S_3	0.19	0.28	0.34	0.41	158	-1.648
Errors +G+S	0.13	0.19	0.30	0.35	158	-1.035
Errors -G-S	0.16	0.19	0.31	0.35	158	-0.500
Preceding	0.09	0.08	0.14	0.12	158	0.650
Following	0.09	0.09	0.20	0.18	158	0.105
Matrix	0.11	0.10	0.16	0.14	158	0.417
Embed./conj.	0.08	0.07	0.14	0.09	158	0.485

TABLE XLVIII

t-TEST RESULTS ON ORAL READING FOR "NOUN PHRASE + VERB + OTHER ELEMENTS DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.06	0.06	0.11	0.09	158	0.064
Proportion (including)	0.06	0.06	0.11	0.08	158	0.547
Errors G_1	0.14	0.23	0.30	0.40	158	-1.598
Errors G_2	0.10	0.24	0.25	0.40	158	-2.759
Errors S_1						
Errors S_2	0.06	0.19	0.19	0.36	158	-2.782
Errors S_3	0.07	0.21	0.20	0.38	158	-2.956
Errors +G+S	0.06	0.18	0.19	0.36	158	-2.675
Errors -G-S	0.20	0.25	0.35	0.40	158	-0.852
Preceding	0.05	0.07	0.09	0.10	158	-0.936
Following	0.08	0.04	0.19	0.15	158	1.339
Matrix	0.05	0.06	0.09	0.12	158	-0.728
Embed./conj.	0.08	0.05	0.19	0.09	158	1.401

TABLE XLIX

t-TEST RESULTS ON ORAL READING FOR "COMPARATIVE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.05	0.09	0.10	0.16	158	-1.874
Proportion (including)	0.06	0.10	0.11	0.16	158	-1.780
Errors G_1	0.24	0.31	0.41	0.44	158	-1.014
Errors G_2	0.16	0.16	0.35	0.33	158	0.051
Errors S_1						
Errors S_2	0.09	0.05	0.27	0.20	158	0.917
Errors S_3	0.15	0.13	0.34	0.32	158	0.332
Errors +G+S	0.09	0.04	0.27	0.17	158	1.311
Errors -G-S	0.16	0.17	0.33	0.34	158	-0.217
Preceding	0.05	0.09	0.11	0.16	158	-1.836
Following						
Matrix	0.05	0.10	0.13	0.17	158	-1.992
Embed./conj.	0.04	0.09	0.11	0.19	158	-1.981

TABLE L

t-TEST RESULTS ON ORAL READING FOR "COMPARATIVE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	0.05	0.06	0.09	0.10	158	-0.622
Proportion (including)	0.05	0.06	0.09	0.11	158	-0.869
Errors G_1	0.16	0.17	0.35	0.35	158	-0.163
Errors G_2	0.11	0.14	0.30	0.30	158	-0.529
Errors S_1	0.01	0.02	0.11	0.16	158	-0.580
Errors S_2	0.06	0.10	0.23	0.27	158	-1.056
Errors S_3	0.08	0.13	0.26	0.30	158	-1.159
Errors +G+S	0.06	0.10	0.23	0.27	158	-0.906
Errors -G-S	0.19	0.21	0.37	0.37	158	-0.354
Preceding	0.05	0.06	0.09	0.10	158	-0.851
Following	0.00	0.01	0.04	0.05	158	-0.580
Matrix	0.06	0.05	0.12	0.10	158	0.194
Embed./conj.	0.04	0.08	0.13	0.19	158	-1.653

TABLE LI

t-TEST RESULTS ON CLOZE TESTS FOR "WH DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.361	.353	.318	.311	159	-0.057
Proportion (including)	.350	.349	.319	.293	159	0.039
Errors G_1	.480	.474	.417	.422	159	0.133
Errors G_2	.363	.381	.407	.391	159	-0.396
Errors G_1G_2	.333	.326	.393	.382	159	0.173
Errors S_1						
Errors S_2	.170	.178	.309	.327	159	-0.233
Errors S_3	.314	.324	.383	.389	159	-0.234
Errors -G-S	.309	.386	.373	.394	159	-2.076
Errors +G+S	.156	.147	.295	.300	159	0.270
Preceding	.357	.310	.417	.373	159	1.178
Following	.355	.350	.416	.397	159	0.111
Matrix	.343	.336	.378	.363	159	0.202
Embed./conj.	.266	.307	.386	.372	159	-1.002

TABLE LII

t-TEST RESULTS ON CLOZE TESTS FOR "WH DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.385	.410	.248	.292	159	-0.897
Proportion (including)	.385	.375	.248	.256	159	0.401
Errors G_1	.534	.498	.403	.370	159	0.889
Errors G_2	.449	.477	.386	.373	159	-0.660
Errors G_1G_2	.425	.421	.385	.367	159	0.096
Errors S_1	.005	.012	.041	.066	159	-1.040
Errors S_2	.238	.289	.340	.326	159	-1.344
Errors S_3	.383	.424	.378	.357	159	-0.989
Errors -G-S	.344	.346	.368	.343	159	-0.034
Errors +G+S	.222	.260	.337	.307	159	-1.053
Preceding	.444	.399	.343	.351	159	1.177
Following	.345	.387	.332	.370	159	-1.203
Matrix	.444	.421	.334	.349	159	0.649
Embed./conj.	.302	.346	.352	.347	159	-1.230

TABLE LIII

t-TEST RESULTS ON CLOZE TESTS FOR "BE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.351	.419	.373	.383	159	-1.695
Proportion (including)	.356	.383	.372	.345	159	-0.741
Errors G_1	.321	.374	.405	.407	159	-1.120
Errors G_2	.348	.355	.411	.399	159	-0.692
Errors G_1G_2	.279	.304	.381	.382	159	-0.577
Errors S_1	.032	.019	.164	.136	159	0.827
Errors S_2	.125	.168	.299	.296	159	-1.327
Errors S_3	.290	.290	.394	.372	159	-0.013
Errors -G-S	.265	.362	.377	.400	159	-2.393
Errors +G+S	.120	.144	.297	.277	159	-0.784
Preceding	.147	.172	.319	.352	159	-0.612
Following	.325	.449	.408	.410	159	-3.091
Matrix	.314	.271	.464	.445	89	0.520
Embed./conj.	.014	.379	.083	.466	89	-6.240

TABLE LIV

t-TEST RESULTS ON CLOZE TESTS FOR "BE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.279	.320	.283	.283	159	-1.429
Proportion (including)	.279	.356	.283	.260	159	-2.893
Errors G_1	.380	.451	.394	.400	159	-1.588
Errors G_2	.426	.486	.406	.394	159	-1.604
Errors G_1G_2	.315	.379	.373	.376	159	-1.688
Errors S_1	.038	.045	.153	.159	159	-0.373
Errors S_2	.228	.283	.353	.355	159	-1.671
Errors S_3	.389	.441	.409	.401	159	-1.290
Errors -G-S	.367	.331	.384	.364	159	0.884
Errors +G+S	.157	.195	.303	.297	159	-1.138
Preceding	.138	.163	.239	.280	159	-0.754
Following	.247	.312	.304	.336	159	-1.897
Matrix	.280	.311	.403	.417	159	-0.723
Embed./conj.	.167	.258	.330	.300	159	-2.678

TABLE LV

t-TEST RESULTS ON CLOZE TESTS FOR "WH + BE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.310	.264	.252	.249	159	2.055
Proportion (including)	.310	.264	.252	.229	159	2.133
Errors G_1	.488	.511	.385	.372	159	-0.559
Errors G_2	.435	.517	.390	.379	159	-1.987
Errors G_1G_2	.382	.454	.381	.373	159	-1.644
Errors S_1	.003	.005	.030	.044	159	-0.323
Errors S_2	.218	.242	.340	.333	159	-0.703
Errors S_3	.361	.420	.386	.374	159	-1.296
Errors -G-S	.323	.369	.348	.358	159	-1.313
Errors +G+S	.185	.195	.319	.300	159	-0.279
Preceding	.276	.210	.367	.335	159	2.023
Following	.315	.290	.306	.299	159	0.818
Matrix	.257	.216	.298	.270	159	1.578
Embed./conj.	.330	.300	.361	.325	159	0.792

TABLE LVI

t-TEST RESULTS ON CLOZE TESTS FOR "WH + BE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.309	.311	.236	.221	159	-0.079
Proportion (including)	.309	.293	.236	.208	159	0.751
Errors G_1	.538	.574	.378	.328	159	-0.997
Errors G_2	.524	.529	.360	.324	159	-0.139
Errors G_1G_2	.472	.480	.377	.335	159	-0.239
Errors S_1	.048	.025	.174	.091	159	1.501
Errors S_2	.317	.318	.336	.321	159	-0.055
Errors S_3	.449	.452	.347	.324	159	-0.107
Errors -G-S	.339	.346	.328	.302	159	-0.251
Errors +G+S	.270	.282	.333	.315	159	-0.355
Preceding	.332	.320	.325	.320	159	0.342
Following	.310	.285	.341	.308	159	0.804
Matrix	.306	.336	.281	.266	159	-1.023
Embed./conj.	.284	.222	.409	.272	159	1.784

TABLE LVII

t-TEST RESULTS ON CLOZE TESTS FOR "(THAT) + S AS OBJECT" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.428	.398	.308	.320	139	0.960
Proportion (including)	.428	.382	.308	.304	139	1.483
Errors G_1	.521	.473	.422	.372	139	1.003
Errors G_2	.365	.314	.416	.374	139	1.109
Errors G_1G_2	.321	.287	.400	.364	139	0.764
Errors S_1	.011	.012	.094	.073	139	-0.098
Errors S_2	.194	.146	.331	.296	139	1.174
Errors S_3	.319	.283	.400	.371	139	0.752
Errors -G-S	.249	.366	.346	.353	139	-3.019
Errors +G+S	.178	.140	.318	.287	139	0.939
Preceding	.180	.274	.331	.388	139	-1.893
Following	.438	.390	.354	.348	139	1.313
Matrix	.265	.330	.372	.376	139	-1.400
Embed./conj.	.474	.366	.361	.331	139	2.970

TABLE LVIII

t-TEST RESULTS ON CLOZE TESTS FOR "(THAT) + S AS OBJECT" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.40	.36	.19	.21	158	1.103
Proportion (including)	.40	.36	.19	.21	158	1.137
Errors G_1	.63	.61	.29	.28	158	0.337
Errors G_2	.55	.54	.32	.28	158	0.200
Errors G_1G_2	.47	.46	.32	.27	158	0.341
Errors S_1	.00	.01	.02	.04	158	-1.228
Errors S_2	.25	.22	.28	.23	158	0.701
Errors S_3	.50	.48	.32	.28	158	0.436
Errors -G-S	.26	.31	.27	.27	158	-1.052
Errors +G+S	.23	.18	.26	.20	158	1.188
Preceding	.33	.25	.33	.30	158	1.616
Following	.41	.39	.21	.24	158	0.515
Matrix	.36	.31	.29	.28	158	1.020
Embed./conj.	.41	.38	.21	.25	158	0.949

TABLE LIX

t-TEST RESULTS ON CLOZE TESTS FOR "PERFORMATIVE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.235	.194	.368	.332	159	1.069
Proportion (including)	.235	.320	.368	.322	159	-2.161
Errors G_1	.105	.289	.297	.404	159	-4.366
Errors G_2	.193	.379	.387	.432	159	-3.959
Errors G_1G_2	.105	.244	.297	.378	159	-3.440
Errors S_1	.000	.012	.000	.096	159	0.000
Errors S_2	.136	.182	.334	.332	159	-1.151
Errors S_3	.174	.334	.371	.420	159	-3.572
Errors -G-S	.339	.402	.467	.431	159	-1.175
Errors +G+S	.080	.151	.260	.316	159	-2.081
Preceding	.235	.179	.368	.320	159	1.453
Following	.000	.012	.000	.111	159	0.000

TABLE LX

t-TEST RESULTS ON CLOZE TESTS FOR "PERFORMATIVE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.307	.301	.356	.383	159	0.158
Proportion (including)	.307	.439	.356	.377	159	-3.546
Errors G_1	.238	.208	.383	.360	159	0.685
Errors G_2	.258	.203	.397	.356	159	1.281
Errors G_1G_2	.238	.182	.387	.340	159	1.359
Errors S_1	.000	.003	.000	.039	159	0.000
Errors S_2	.179	.138	.357	.299	159	1.144
Errors S_3	.214	.193	.379	.347	159	0.504
Errors -G-S	.314	.421	.428	.455	159	-2.515
Errors +G+S	.162	.125	.343	.291	159	1.077
Preceding	.261	.272	.355	.391	159	-0.295
Following	.100	.075	.300	.263	159	0.755

TABLE LXI

t-TEST RESULTS ON CLOZE TESTS FOR "IMPERATIVE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.[illegible]77	.253	.270	.323	119	0.740
Proportion (including)	.269	.237	.262	.300	119	1.003
Errors G_1	.415	.541	.410	.418	119	-2.286
Errors G_2	.433	.535	.411	.413	119	-1.857
Errors G_1G_2	.382	.450	.409	.424	119	-1.233
Errors S_1						
Errors S_2	.268	.266	.386	.366	119	0.041
Errors S_3	.401	.454	.409	.404	119	-0.966
Errors -G-S	.379	.208	.406	.314	119	3.748
Errors +G+S	.235	.174	.369	.324	119	1.299
Preceding	.125	.000	.331	.000	119	0.000
Following	.260	.244	.287	.316	119	0.457
Matrix	.550	.450	.497	.472	119	0.940
Embed./conj.	.150	.016	.357	.072	119	1.799

TABLE LXII

t-TEST RESULTS ON CLOZE TESTS FOR "IMPERATIVE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.376	.407	.334	.346	159	-0.885
Proportion (including)	.376	.374	.334	.328	159	0.058
Errors G_1	.467	.406	.440	.425	159	1.359
Errors G_2	.498	.425	.458	.415	159	1.689
Errors G_1G_2	.412	.328	.440	.386	159	1.999
Errors S_1	.061	.031	.226	.102	159	1.457
Errors S_2	.268	.232	.402	.340	159	0.910
Errors S_3	.439	.409	.459	.421	159	0.701
Errors -G-S	.248	.268	.378	.366	159	-0.538
Errors +G+S	.216	.167	.367	.308	159	1.263
Preceding	.147	.178	.347	.376	159	-0.702
Following	.369	.371	.353	.374	159	-0.037
Matrix	.291	.378	.427	.455	89	-1.251
Embed./conj.	.133	.250	.323	.417	89	-2.176

TABLE LXIII

t-TEST RESULTS ON CLOZE TESTS FOR "PREPOSITION DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.353	.369	.304	.312	159	-0.445
Proportion (including)	.346	.324	.303	.253	159	0.683
Errors G_1	.507	.505	.372	.368	159	0.039
Errors G_2	.414	.497	.388	.371	159	-2.003
Errors G_1G_2	.308	.365	.331	.371	159	-1.473
Errors S_1	.034	.027	.106	.092	159	0.635
Errors S_2	.232	.250	.325	.318	159	-0.471
Errors S_3	.382	.464	.381	.378	159	-1.996
Errors -G-S	.236	.286	.319	.322	159	-1.470
Errors +G+S	.150	.157	.254	.262	159	-0.203
Preceding	.381	.388	.372	.366	159	-0.177
Following	.287	.275	.383	.351	159	0.279

TABLE LXIV

t-TEST RESULTS ON CLOZE TESTS FOR "PREPOSITION DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.442	.413	.322	.291	159	0.908
Proportion (including)	.427	.402	.308	.282	159	0.820
Errors G_1	.476	.478	.389	.394	159	-0.039
Errors G_2	.496	.511	.407	.400	159	-0.330
Errors G_1G_2	.389	.398	.382	.381	159	-0.208
Errors S_1	.029	.021	.113	.075	159	0.808
Errors S_2	.302	.297	.366	.359	159	0.130
Errors S_3	.447	.466	.408	.395	159	-0.427
Errors -G-S	.252	.279	.343	.343	159	-0.803
Errors +G+S	.220	.225	.312	.308	159	-0.163
Preceding	.417	.434	.368	.391	159	-0.387
Following	.375	.384	.370	.382	159	-0.219

TABLE LXV

t-TEST RESULTS ON CLOZE TESTS FOR "VERB PHRASE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.394	.400	.277	.286	159	-0.193
Proportion (including)	.394	.448	.277	.252	159	-2.254
Errors G_1	.493	.479	.390	.341	159	0.353
Errors G_2	.540	.574	.401	.370	159	-0.856
Errors G_1G_2	.449	.460	.393	.344	159	-0.304
Errors S_1	.015	.012	.092	.090	159	0.297
Errors S_2	.317	.315	.371	.342	159	0.051
Errors S_3	.498	.491	.400	.373	159	0.179
Errors -G-S	.284	.305	.336	.322	159	-0.660
Errors +G+S	.267	.254	.350	.320	159	0.401
Preceding	.385	.370	.281	.296	159	0.533
Following	.063	.106	.242	.308	159	-1.351
Matrix	.344	.404	.301	.345	159	-1.879
Embed./conj.	.344	.512	.413	.323	159	-4.159

TABLE LXVI

t-TEST RESULTS ON CLOZE TESTS FOR "VERB PHRASE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.384	.325	.336	.280	159	1.778
Proportion (including)	.380	.406	.336	.286	159	-0.771
Errors G_1	.394	.435	.364	.372	159	-0.947
Errors G_2	.420	.434	.377	.374	159	-0.328
Errors G_1G_2	.355	.389	.358	.362	159	-0.803
Errors S_1	.009	.001	.088	.009	159	1.239
Errors S_2	.191	.153	.307	.268	159	1.284
Errors S_3	.377	.316	.366	.350	159	1.571
Errors -G-S	.337	.368	.342	.365	159	-0.915
Errors +G+S	.134	.123	.240	.258	159	0.431
Preceding	.352	.353	.334	.336	159	-0.012
Following	.100	.174	.300	.357	159	-2.010
Matrix	.341	.341	.358	.345	159	0.014
Embed./conj.	.381	.415	.441	.360	159	-0.767

TABLE LXVII

t-TEST RESULTS ON CLOZE TESTS FOR "NOUN PHRASE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.342	.349	.289	.325	159	-0.215
Proportion (including)	.337	.331	.288	.297	159	0.177
Errors G_1	.480	.504	.417	.516	159	-0.557
Errors G_2	.481	.472	.391	.416	159	0.208
Errors G_1G_2	.432	.431	.397	.406	159	0.031
Errors S_1	.003	.017	.039	.102	159	-1.546
Errors S_2	.219	.198	.318	.312	159	0.634
Errors S_3	.406	.367	.381	.382	159	0.964
Errors -G-S	.338	.277	.373	.355	159	1.637
Errors +G+S	.184	.167	.300	.295	159	0.562
Preceding	.360	.337	.359	.391	159	0.579
Following	.328	.300	.397	.388	159	0.625
Matrix	.339	.337	.387	.408	159	0.049
Embed./conj.	.308	.322	.348	.335	159	-0.392

TABLE LXVIII

t-TEST RESULTS ON CLOZE TESTS FOR "NOUN PHRASE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.355	.288	.288	.248	159	2.506
Proportion (including)	.355	.292	.288	.234	159	2.402
Errors G_1	.502	.629	.379	.328	159	-3.222
Errors G_2	.526	.656	.393	.318	159	-3.559
Errors G_1G_2	.445	.555	.376	.335	159	-2.908
Errors S_1	.018	.016	.075	.079	159	0.140
Errors S_2	.329	.425	.357	.343	159	-2.531
Errors S_3	.467	.600	.388	.337	159	-3.589
Errors -G-S	.335	.235	.361	.272	159	3.087
Errors +G+S	.270	.331	.324	.312	159	-1.743
Preceding	.329	.272	.328	.287	159	1.734
Following	.307	.292	.335	.333	159	0.414
Matrix	.289	.248	.323	.282	159	1.225
Embed./conj.	.394	.357	.338	.325	159	1.042

TABLE LXIX

t-TEST RESULTS ON CLOZE TESTS FOR "NOUN PHRASE + AUXILIARY (VERB) DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.208	.241	.252	.265	159	-1.151
Proportion (including)	.208	.255	.252	.257	159	-1.648
Errors G_1	.590	.586	.356	.373	159	0.088
Errors G_2	.569	.483	.392	.392	159	2.049
Errors G_1G_2	.486	.428	.389	.386	159	1.402
Errors S_1	.009	.007	.050	.061	159	0.287
Errors S_2	.279	.243	.362	.315	159	0.965
Errors S_3	.521	.400	.406	.375	159	2.976
Errors -G-S	.277	.308	.325	.344	159	-0.825
Errors +G+S	.223	.204	.324	.296	159	0.545
Preceding	.242	.239	.332	.285	159	0.079
Following	.172	.222	.326	.369	159	-1.237
Matrix	.232	.232	.334	.299	159	0.004
Embed./conj.	.192	.260	.339	.311	159	-1.814

TABLE LXX

t-TEST RESULTS ON CLOZE TESTS FOR "NOUN PHRASE + AUXILIARY (VERB) DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.338	.369	.296	.338	149	-0.812
Proportion (including)	.334	.370	.294	.321	149	-0.973
Errors G_1	.476	.513	.402	.368	149	-0.800
Errors G_2	.553	.509	.393	.398	149	1.004
Errors G_1G_2	.433	.428	.388	.371	149	0.116
Errors S_1	.004	.000	.034	.000	149	0.000
Errors S_2	.375	.331	.371	.361	149	1.004
Errors S_3	.518	.477	.390	.399	149	0.953
Errors -G-S	.284	.261	.357	.326	149	0.653
Errors +G+S	.289	.258	.337	.322	149	0.768
Preceding	.381	.365	.326	.348	149	0.408
Following	.124	.215	.284	.341	149	-2.263
Matrix	.287	.295	.304	.331	149	-0.203
Embed./conj.	.249	.373	.371	.358	149	-2.714

TABLE LXXI

t-TEST RESULTS ON CLOZE TESTS FOR "NOUN PHRASE + VERB + OTHER ELEMENTS DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.323	.347	.249	.287	159	-0.831
Proportion (including)	.323	.388	.249	.276	159	-2.433
Errors G_1	.527	.577	.372	.366	159	-1.213
Errors G_2	.517	.542	.371	.367	159	-0.611
Errors G_1G_2	.444	.503	.367	.373	159	-1.455
Errors S_1	.011	.009	.091	.053	159	0.318
Errors S_2	.287	.268	.350	.350	159	0.551
Errors S_3	.432	.469	.368	.378	159	-0.982
Errors -G-S	.325	.282	.328	.320	159	1.239
Errors +G+S	.231	.245	.313	.341	159	-0.426
Preceding	.371	.379	.323	.336	159	-0.[illegible]
Following	.280	.248	.380	.372	159	0.793
Matrix	.349	.377	.346	.340	159	-0.745
Embed./conj.	.313	.399	.372	.325	159	-2.555

TABLE LXXII

t-TEST RESULTS ON CLOZE TESTS FOR "NOUN PHRASE + VERB + OTHER ELEMENTS DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.303	.315	.221	.240	159	-0.537
Proportion (including)	.301	.368	.220	.230	159	-3.457
Errors G_1	.534	.548	.331	.300	159	-0.415
Errors G_2	.586	.570	.364	.302	159	0.489
Errors G_1G_2	.255	.457	.344	.298	159	-0.060
Errors S_1	.024	.022	.107	.073	159	-0.154
Errors S_2	.404	.325	.362	.292	159	2.386
Errors S_3	.517	.479	.381	.316	159	1.117
Errors -G-S	.300	.309	.322	.278	159	-0.311
Errors +G+S	.300	.251	.310	.262	159	1.700
Preceding	.315	.315	.238	.256	159	0.017
Following	.143	.175	.256	.313	159	-1.090
Matrix	.310	.312	.248	.255	159	-0.088
Embed./conj.	.261	.409	.372	.281	159	-4.713

TABLE LXXIII

t-TEST RESULTS ON CLOZE TESTS FOR "COMPARATIVE DELETION" AT THE FIRST-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.368	.463	.282	.316	124	-3.156
Proportion (including)	.368	.403	.282	.291	124	-1.171
Errors G_1	.525	.486	.394	.377	124	0.760
Errors G_2	.402	.337	.402	.368	124	1.375
Errors G_1G_2	.361	.317	.387	.360	124	0.957
Errors S_1	.019	.013	.108	.098	124	0.405
Errors S_2	.209	.163	.333	.303	124	1.317
Errors S_3	.346	.268	.394	.340	124	1.809
Errors -G-S	.314	.306	.352	.326	124	0.201
Errors +G+S	.171	.153	.295	.296	124	0.542
Preceding	.372	.461	.290	.317	124	-2.836
Following	.008	.024	.089	.153	124	-1.420
Matrix	.325	.430	.310	.362	124	-2.740
Embed./conj.	.366	.450	.417	.379	124	-1.864

TABLE LXXIV

t-TEST RESULTS ON CLOZE TESTS FOR "COMPARATIVE DELETION" AT THE SECOND-GRADE LEVEL

Variable	Mean on deleted	Mean on intact	SD on deleted	SD on intact	df	t
Proportion (excluding)	.16	.36	.15	.19	158	-7.407
Proportion (including)	.17	.33	.16	.18	158	-5.928
Errors G_1	.56	.55	.34	.26	158	0.096
Errors G_2	.42	.53	.36	.26	158	-2.179
Errors G_1G_2	.40	.44	.35	.25	158	-0.862
Errors S_1	.01	.03	.05	.07	158	-2.124
Errors S_2	.18	.32	.26	.24	158	-3.695
Errors S_3	.35	.44	.34	.27	158	-1.769
Errors -G-S	.40	.37	.33	.27	158	0.762
Errors +G+S	.17	.28	.24	.22	158	-3.152
Preceding	.16	.37	.15	.20	158	-7.325
Following						
Matrix	.16	.35	.19	.22	158	-5.926
Embed./conj.	.15	.30	.26	.22	158	-3.884